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BOLIVIA:
A COMMERCIAL AND INDUSTRIAL
HANDBOOK

BUREAU OF FOREIGN AND DOMESTIC COMMERCE

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FIG. 1.—GENERAL VIEW OF LA PAZ.

DEPARTMENT OF COMMERCE

BUREAU OF FOREIGN AND DOMESTIC COMMERCE

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BOLIVIA

A COMMERCIAL AND INDUSTRIAL HANDBOOK

BY

W. L. SCHURZ

Trade Commissioner

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LETTER OF SUBMITTAL.

DEPARTMENT OF COMMERCE,
BUREAU OF FOREIGN AND DOMESTIC COMMERCE,
Washington, May 10, 1921.

SIR: There is submitted herewith a commercial and industrial handbook of Bolivia, by W. L. Schurz, a trade commissioner of this Bureau (now commercial attaché at Rio de Janeiro), who is also the author of the handbook of Paraguay, which was published as Special Agents Series No. 199. Similar handbooks of Colombia and of Venezuela, prepared by another representative of the Bureau, will soon come from the press.

Mr. Schurz made a comprehensive personal investigation of the economic activities in Bolivia and the conditions governing the commercial life of the Republic. The results of his studies, embodied in this handbook, will, it is felt, be of substantial benefit to Americans who desire to sell in the Bolivian markets or to participate in the development of the country's great natural resources.

Mr. Schurz wishes to express his thanks to the following persons, who aided him in the course of his investigations of conditions in Bolivia: S. Abbott Maginnis, American Minister; W. Duval Brown, American consul; Nelson R. Park, American vice consul; Bautista Saavedra, President of the Republic; José Gutierrez Guerra, former President of the Republic; Carlos Gutierrez, Minister of Foreign Affairs; Julio Zamora, Minister of Finance; Ernesto Careaga Lanza, Minister of Government; Cesar Ochavez, Minister of Public Works and Industry; Gen. Zenon Cossio, prefect of the Department of Cochabamba; David Ascarrunz, prefect of the Department of Oruro; Nestor Velasco, prefect of the Department of La Paz; Moises Ascarrunz, director of the Bureau of Statistics; Carlos Tejada Sorzano, director general of the National Railways; Jacob Backus, general manager of the Bolivian section of the Antofagasta & Bolivia Railway; Angel Sandoval, delegate of the Territory of Oriente and now justice of the Supreme Court.

Respectfully,

C. E. HERRING,,
Acting Director of Bureau.

TO HON. HERBERT HOOVER,
Secretary of Commerce.

UNITS OF MEASURE AND VALUE USED IN THIS WORK.

Measures.	Unit.	Equivalent.
Weight.....	Kilo.....	2.2 pounds.
	Pound.....	.45 kilo.
	Metric ton.....	2,205 pounds.
	Spanish quintal.....	101.41 pounds.
Volume, liquid.....	Liter.....	.264 gallon.
	Gallon.....	3.785 liters.
Length of distance.....	Meter.....	39.37 inches.
	Foot.....	.3048 meter.
	Kilometer.....	.62 mile.
	Mile.....	1.6 kilometers.
Area.....	Hectare.....	2.47 acres.
	Acre.....	.404 hectare.
	Square league.....	1,875 hectares.
		4,632 acres. 7.2 square miles.

Value.	Value in United States gold.
Boliviano.....	¹ \$0.3893
Chilean gold peso.....	.3650
Chilean paper peso.....	(²)

¹ The exchange rate for the boliviano has varied as follows during 1919 and 1920, according to a statement issued by the United States Treasury Department: Apr. 1, 1919, \$0.3785; Oct. 1, 1919, \$0.33; Jan. 1, 1920, \$0.3257; April 1, 1920, \$0.3497; July 1, 1920, \$0.3311; Oct. 1, 1920, \$0.3175; Jan. 1, 1921, \$0.2717; April 1, 1921, \$0.26.

² The exchange rate for the Chilean paper peso (inconvertible) has varied, during 1919, 1920, and 1921, between \$0.1375 and \$0.2075.

BOLIVIA: A COMMERCIAL AND INDUSTRIAL HANDBOOK.

INTRODUCTION.

GEOGRAPHY.

Bolivia, one of the two inland countries of South America, is bounded on the north and east by Brazil, on the south by Argentina and Paraguay, and on the west by Peru and Chile. The Republic formerly had an outlet to the sea through the Department of Atacama, but lost its Pacific littoral, including the port of Antofagasta, in the war with Chile in 1879.

Though no accurate survey of the extent of the country has been made or can be made until its boundaries are defined, its area has been estimated at from 473,560 to 704,195 square miles. The National Bureau of Statistics puts the area of the Republic at 514,464 square miles, though this is very probably in excess of the true figure. Its area is approximately that of the neighboring Republic of Peru and about twice the size of the State of Texas.

The Republic is divided into eight Departments and three national Territories. These divisions, with their respective areas, are as follows:

Divisions.	Location.	Area.	
		Square kilometers.	Square miles.
Departments:			
La Paz.....	Northwest.....	105,406	40,686
Oruro.....	West-central.....	53,518	20,657
Cochabamba.....	Central.....	65,514	25,288
Potosi.....	Southwest.....	116,663	45,031
Chuquisaca.....	Southeast.....	94,125	36,342
Tarija.....	South.....	81,779	31,567
Santa Cruz.....	East.....	301,422	116,344
El Beni.....	North.....	247,033	95,354
Territories:			
Colonias.....	Northwest.....	72,381	27,939
Oriente.....	East.....	74,341	28,695
Chaco.....	Southeast.....	120,626	46,561
Total.....		1,332,808	514,464

As the ownership of the entire extent of the Gran Chaco is in dispute with Paraguay, figures as to the area of the Bolivian section must still be considered as purely arbitrary estimates.

The north-and-south distance from Manoa, at the junction of the Abuna and Madeira, to Yacuiba, on the Argentine border, is about 930 miles. From Charana, where the railway from Arica to La Paz crosses the frontier, east by Cochabamba and Santa Cruz to Puerto Suarez, on the Paraguay River, the distance is about 1,120 miles. From Guaqui, on the southern shores of Lake Titicaca, southeast over the length of the Bolivian plateau to the Argentine railhead at La Quiaca is about 560 miles.

TOPOGRAPHY.

Because of the circumstance that the predominant industry of the Republic has always been mining and that this mineral development is naturally concentrated on the plateau, Bolivia is popularly believed to be a prevaillingly mountainous country. However, although the principal centers of population and the economic center of gravity of the Republic are located on the plateau, more than two-thirds of its area lies to the east of the mountains in the great plains that stretch south with few breaks from the Acre and the Abuna and merge into the disputed "llanuras" of the Chaco. In fact, the surface of Bolivia can be roughly divided into three general regions—(1) the mountain, or Andean; (2) the intermediary, or "montaña;" and (3) the plains, or Amazonia-Chaco.

MOUNTAINS.

There are three quite clearly definable ranges of the Andes in Bolivia. The first and most westerly of these is the Cordillera Occidental, whose greatest heights lie across the border in Chile, but whose eastern slopes and outposts lie within the confines of Bolivia. The loftiest peak of the Western Cordillera lying within Bolivia is Sajama, with an altitude of 21,526 feet. Most of the mountain area lies among the Cordillera Real, or main range of the Andes, which enters Bolivia by the Province of Muncas to the north of Lake Titicaca and extends in a slightly southeasterly direction to the Argentine border. The highest part of the Royal Cordillera lies within the Department of La Paz, where the traveler approaching the capital from Viacha sees before him a vast wall of snowcapped mountains, with several lofty peaks towering above the general level of the plateau. The loftiest of the Bolivian peaks are Illimani and Illampu. Illimani, which is clearly visible from La Paz, is estimated to be about 22,572 feet high. Illampu towers above the town of Sorata, to the northeast of Lake Titicaca, at a height of about 23,900 feet above the sea. Other notable peaks are: Chachacomani, 21,428 feet; Torani, 21,320; Parinacocha, 20,529; Quimsachata, 19,909; and Huayna Potosi, 19,680.

Though the Cordillera Real is at its highest in the Department of La Paz, it extends across the Departments of Oruro and Potosi, and its more easterly ranges cover the western part of the Departments of Cochabamba, Chuquisaca, and Tarija. Near the point where the three Departments of La Paz, Oruro, and Cochabamba meet, another chain of the Andes, known as the Cordillera Oriental, or Eastern Cordillera, branches off to the east and crosses the Department of Cochabamba, finally descending by stages into the plains of Santa Cruz. The highest point of this range is Mount Tunari, which overlooks the city of Cochabamba at a height of 16,400 feet.

Between the two principal ranges of the Andes lies the great Bolivian "meseta" or table-land, which extends from Lake Titicaca south to the mountain knot of Sur Lipez. For the greater part of its length it is traversed by the main line of the railway from Antofagasta to La Paz. The plateau floor is about 450 miles long, with an average width of about 80 miles. Its average height above the sea is about 12,465 feet, ranking it with the Tibetan plateau among the highest inhabited regions of the globe. Its surface is not uniform, though there are large extents of level country, as in the Uyuni plains

of Nor Lipez and in the Carangas region of the Department of Oruro, while the "alto" of La Paz is very characteristic of the table-land. Much of the northern part of the "meseta" is broken by ranges of hills and offshoots of either one or the other of the main cordilleras. Two large depressions in the table-land are filled by the lakes of Poopo and Coipasa. The surface of the plateau is treeless, and its general aspect is bleak and desolate, though much of it is covered with grass and with a low scrub growth known as "tola." Considerable areas of barley are also grown by the Indians of the region.

On the eastern slopes of the Cordillera Real and on the northern side of its offshoot, the Cordillera Oriental, is an intermediary district of deep valleys, which is generally known in South America as the "montaña," but in Bolivia is called the Yungas. The Yungas proper of the Departments of La Paz and Cochabamba is a region of heavy rainfall and semitropical or tropical climate, with a correspondingly luxuriant vegetation. Its typical products are coca, coffee, and oranges. Southward from the Province of Vallegrande, in the Department of Santa Cruz, the character of the country lying among the eastern ranges and foothills of the Andes changes quite radically. Temperatures are generally lower and the rainfall is much less, with the result that the vegetation is sparser. Also, the descent from the "páramo," or higher parts of the Andes, to the region of warm valleys is much more gradual than in the Department of La Paz, where a traveler who crosses the divide in the morning, at a height of more than 15,000 feet, may be down among the orange groves by nightfall.

The lowland region of Bolivia includes the Territory of Colonias, the Department of El Beni, the northern half of Cochabamba, nearly all of Santa Cruz, the eastern parts of Chuquisaca and Tarija, and the uncertain extent of the Bolivian Chaco. The Chaco is a vast plain with a slight fall toward the southeast. Most of it consists of open prairie, but islets of palm trees are scattered at frequent intervals over its surface, and nearer the Paraguay River its monotony is broken by denser forests which contain the famous quebracho tree. In contrast to the well-watered Beni region about the Amazon headwaters, the Chaco is almost riverless.

The Beni region consists for the most part of a vast forested or "selva" country, with some wide areas of open lands, as in the Mojos plains of the Mamore basin. This district, the Bolivian Amazonia, is the seat of the rubber industry of the Republic. Between the Amazonian and Chaco plains lie the Chiquitos highlands of the Department of Santa Cruz, whose maximum height is 3,894 feet. To the west, the easternmost outposts of the Andes reach out across the Province of Vallegrande, until their final undulations disappear a short distance from the city of Santa Cruz. The gap between the Vallegrande and the Chiquitos highlands is largely occupied by the lowland wilderness of the Monte Grande, which thus connects the plains of the Beni with those of the Chaco. On one side of the Monte Grande flows the San Miguel and on the other the Guapay or Grande—tributaries, respectively, of the Itenez and Mamore systems.

RIVERS AND LAKES.

There are three quite independent drainage systems in Bolivia—the Amazon, the Paraguay-Plata, and the Lake Titicaca-Desaguadero system of the plateau.

Of Amazonian rivers, the Acre and the Abuna form part of the northern border of the Territory of Colonias. The Acre is a tributary of the Purus, and its waters reach the Amazon through Brazilian territory. The Abuna empties into the Madeira at Manoa, opposite the Porto Murtinho station of the Madeira-Mamore Railway. The Madeira, the Mamore, and the Itenez form the boundary of the Republic from the mouth of the Abuna around to the fourteenth parallel. The Beni is an exclusively Bolivian river and drains most of the Department of La Paz as well as a wide area of lowland country. Its greater tributary, the Madre de Dios, drains the Territory of Colonias. The Mamore itself reaches south into the very heart of the Republic, the Azero, of this system, rising in the latitude of Potosi, near the twentieth parallel.

The following chart will show the general scheme of the river systems of this region; the principal tributaries of each stream are indicated by indentions, and the names by which the upper courses of some of the rivers are known appear in parentheses:

- Amazon.
 - Acre.
 - Madeira.
 - Abuna.
 - Rapirran.
 - Beni.
 - Orton.
 - Tahuamanu.
 - Manuripi.
 - Madre de Dios (Manu).
 - Heath.
 - Azul.
 - Marcapata.
 - Inambari.
 - Madidi.
 - Cochabamba.
 - Bopi.
 - Tamampaya.
 - La Paz.
 - Miguilla.
 - Kaka.
 - Mapiri.
 - Tipuani.
 - Mamore.
 - Yata.
 - Itenez (Guapore).
 - Itonama (San Miguel).
 - Machupo.
 - Baures.
 - Blanco.
 - Paragua.
 - Verde.
 - Yacuma.
 - Rapulo.
 - Apere.
 - Tijamuchi.
 - D'Orbigny.
 - Secure.
 - Isiboro.
 - Sara.
 - Grande.
 - Pirai.
 - Chapare.
 - Chimore.
 - Ichilo.

There are two distinct branches of the Paraguay River system in Bolivia. One of these drains the Chiquitos region in the eastern part of the Department of Santa Cruz. The other consists of the Pilcomayo and the Bermejo, with their tributaries, which drain the southern part of the Republic. The Pilcomayo rises to the northwest of the city of Potosi and, after flowing eastward in a deep gorge, which is crossed by the road from Potosi to Sucre, it turns to the southeast. It then continues in the same general direction for hundreds of miles until it flows into the Paraguay a few miles below Asuncion. From the point where it crosses the twenty-second parallel of latitude to its mouth, it forms the boundary between the disputed area of the Chaco and the Argentine Republic. For this part of its course the Pilcomayo receives no tributaries larger than small creeks, and for a long distance below the twenty-fourth parallel it is lost in the vast morass known as the Esteros de Patino. From this region of reedy swamps it again issues in a clearly defined channel. The tendency of the Pilcomayo to shift its course has produced at least one boundary dispute between Bolivia and Argentina. The Bermejo rises to the south of the city of Tarija and forms the western side of the Bolivian wedge that projects south into Argentine territory, while the Rio Grande de Tarija, its tributary, forms the eastern side of this wedge. After leaving Bolivian territory it flows southeast, roughly parallel to the Pilcomayo, until it empties into the Paraguay.

The hydrographic system consisting of the lakes of Titicaca, Poopo, and Coipasa and the Desaguadero River is entirely independent of both of the other drainage systems of the country. Its area extends from near Sandia in Peru to a place west of the city of Potosi, or over 5 degrees of latitude. Lake Titicaca lies on the border between Bolivia and Peru, at an altitude of 12,644 feet above sea level. Its total area is about 5,187 square miles, and its greatest depth nearly 900 feet. Its extreme length is 138 miles, and its greatest width is 69 miles. It is surrounded by mountains and contains some rugged islands famous in pre-Spanish times. The two peninsulas of Huata and Copacabana almost meet at the Strait of Tiquina, through which the steamers between Puno and Guaqui are compelled to pass. The Desaguadero River forms the outlet of Lake Titicaca and really serves as a canal to carry its waters into Lake Poopo, which lies 185 miles to the southeast, at an altitude 505 feet lower than Lake Titicaca. This it does at the rate of over 5,900 cubic meters per minute. However, the fact that only about 56 cubic meters of water issue from Lake Poopo during an equal time would appear to show that this lake has a subterranean outlet to the Pacific. In normal seasons Lake Poopo has an area of about 386 square miles, but during the rainy season it may overflow a much greater extent of territory to the north and west. Lake Coipasa lies to the west of Poopo, into which its waters flow through the Lacahuira. It is a shallow body of water, whose limits are variable and ill defined.

CLIMATE.

In view of the great differences in altitude between the low plains of the north and east and the higher regions of the plateau, it is only natural that there should be a corresponding diversity of climates in

Bolivia. The extreme difference in height above sea level between Puerto Suarez on the one hand and the summit of Illampu on the other, is about 23,600 feet, and the average altitude of the plateau is nearly 12,000 feet higher than the average level of the eastern plains. The mean average temperature of the Amazonian region up to an altitude of 2,000 feet is about 74° F.; up to 8,000 feet, in the intermediate region, it is about 63°; and on the "altiplano," between 11,000 and 14,000 feet, it is about 50°. The difference in latitude between the northern and southern extremities of the Republic is about 13° 30'; however, altitude is a much more important determinant of local climatic conditions than is latitude.

The customary division of Mexico by climatic belts into "tierra caliente," "tierra templada," and "tierra fria," or hot, temperate, and cold regions, could also be applied to Bolivia.

EASTERN PLAINS.

The climate of the eastern plains country, to an altitude of nearly 2,000 feet in the Andean foothills, is clearly tropical. However, the climate of the southern portion of this region—that is, to the south of the Department of Santa Cruz—is one with very marked differences between summer and winter, and may be classed as rather subtropical than tropical. While the summer heat is excessive in the Tarija and Chaco regions, the winter nights may be uncomfortably cold. This is also an area of much less rainfall than the Amazonian region to the north.

In the latter area there are two general seasons in the year, as throughout most of Bolivia. Of these the dry season coincides with the period of lowest temperatures and lasts from about June to November, while the rainy season, which is also the time of highest temperatures, covers the months from December to May, inclusive. During the dry winter season the weather is quite agreeable, the nights being generally very comfortable, though it is usually hot during the day. The mean annual temperature in the shade at Trinidad in the Beni is about 82° F., and even on summer nights the thermometer may register as low as 66° or 72°. At Villa Bella, which is situated at the confluence of the Beni and the Mamore in about latitude 10° 20' S., the average temperature throughout the year is about 86° F. The cooling "surazos" or south winds, which blow in September and October, often cause violent variations in temperature within a short time. From December to May there are almost daily falls of rain. These torrential and continuous rains cause the rivers to rise and flood vast areas of country, which remain inundated for months. The combination of heavy rainfall and high humidity with the tropical temperatures prevalent for most of the year is responsible for the luxuriant growth of vegetation which covers the greater part of this region.

The climate of the Santa Cruz region varies from subtropical to tropical, the different climatic gradations depending on the diversities of altitude and latitude and on the relative predominance of forest or open country in certain localities. There is little rainfall between July and November, but there are heavy rains from November to March, and rain may also fall in May and June. The rainfall

is heavier in the low-lying Provinces of Cercado, Sara, Nuflo de Chavez, and Velasco than in those of Vallegrande and Cordillera and in most of Chiquitos, though there are occasional torrential rains in the outlying ranges of the Andes and in the hill country of Chiquitos. In some years there is a dearth of rain in Cordillera, especially in the parts bordering the Chaco, though there is generally a supply of subsurface water that could be reached with artesian wells. The average yearly temperature in the shade at Santa Cruz is about 77° F. In June and July the thermometer may fall to 43° in the early morning, though the winter temperatures usually vary between 52° and 72° F. During the summer the temperature varies from 77° to 95° and may even rise to 99° or 100° F.

INTERMEDIATE REGION.

The climate of the intermediate region on the eastern side of the Andes, between about 3,000 and 9,000 feet above sea level, varies from subtropical to temperate. The Yungas proper, as well as the higher country in which Cochabamba and Sucre lie, is included within this zone. The town of Sorata, lying near Lake Titicaca at an altitude of about 8,888 feet, has a mild climate which should make it a favorite resort for the people of La Paz. The climate of the Yungas is warm and in the lower altitudes is even quite hot. The dry and wet seasons are generally very closely marked off, the months of heaviest rainfall being from December to March or April. Little or no rain falls during the so-called winter season, which extends from June into September. The rainfall, which is produced by the moisture-laden winds from the Amazon Basin coming into contact with the mountains, varies directly with the altitude. At Chulumani, which is situated at an altitude of about 3,500 feet, the annual fall is about 40 inches. At the Neque Jahuira camp of the Yungas Railway, which lies at an altitude of 6,790 feet, the rainfall for the first three months of 1920 amounted to 1,600 millimeters, or about 53 inches. The temperature at Chulumani varies from 64° to 88° F., but the winter mornings at the level of Neque Jahuira may be quite chilly. At the Rinconada camp of the railway, which is located at 13,760 feet, the thermometer falls to several degrees below the freezing point, heavy falls of snow are frequent, and the weather is inclement throughout the year. On the descent into the Yungas of La Paz from the divide at 15,300 feet, the first trees are seen at Pongo, at an altitude of 8,900 feet, and the first orange trees are encountered at Chaco, at 6,225 feet.

The mean annual temperature of the city of Cochabamba, which lies at an altitude of 8,435 feet, is about 66½° F. There are no unpleasant extremes of either heat or cold, and the climate is agreeable throughout the year. The warmest days occur in January and the coolest in July. The proportion of sunny days in the year is much greater than that of cloudy days.

The climate of Sucre, at an altitude of 9,338 feet, is exceptionally mild and pleasant throughout the year. The average annual temperature is about 61° F. In November and December the thermometer may reach 70° or even 77° or 82°, and in June may fall to 45°. The total annual rainfall usually amounts to 23 to 25 inches,

nearly all of this falling between December and April, inclusive. During the winter months the atmosphere in the region of Sucre is remarkable for its dryness.

HIGH PLATEAU.

The climate of the high plateau, while prevailingly cold, is not uniformly so. The difference between day and night temperatures is great, sometimes amounting to 50° F. or more. While it may be quite hot in the sunshine of midday, there is usually a rapid fall in temperature after sunset. The nights are nearly always cold, save when the clouding of the sky prevents the radiation of the heat accumulated during the day. However, during the winter season it is a dry cold, which does not cause the discomfort of the more penetrating cold of the nights of the summer or rainy season, when the humidity is always high. On the table-land, temperatures never fall so low as during the winter in the northern part of the United States. As a result of peculiar local conditions, the climate varies considerably on the "altiplano" between places at the same general altitude—as, for example, between La Paz and Uyuni.

According to the Jesuit Observatory of San Calixto in La Paz, the weather conditions prevailing in La Paz during 1919 were as shown in the following table:

Months.	Temperature.			Rainfall.		Prevailing direction of wind.
	Average.	Highest.	Lowest.	Number of days.	Quantity.	
	° F.	° F.	° F.		Inches.	
January.....	52.0	71.6	39.0	16	1.4	Southeast.
February.....	53.2	72.9	38.5	15	2.2	Do.
March.....	48.2	68.5	40.6	22	4.4	Do.
April.....	51.6	72.9	37.9	13	1.2	West.
May.....	49.6	72.1	33.4	1	.1	Do.
June.....	45.0	67.3	28.4	4	.1	Do.
July.....	45.0	68.9	31.6	6	.7	Do.
August.....	45.5	69.4	28.6	3	.1	Do.
September.....	50.2	73.6	32.0	6	.3	Northeast.
October.....	50.2	71.6	35.6	12	2.2	Southeast.
November.....	51.3	73.8	39.2	20	5.4	Northeast.
December.....	50.4	70.2	39.2	24	6.3	Southeast.
Entire year.....	49.3				24.4	

The temperatures given above were registered in the shade. The maximum temperature in the sun is usually from 37° to 42° F. higher than in the shade. In such places as Potosi the difference between the temperatures in the sun and in the shade is even greater.

The daily range of temperature for a given month is illustrated by the report of the Jesuit Observatory for March, 1920, as follows:

Days.	Mini- mum.	Maximum.		Average.
		Shade.	Sun.	
	° F.	° F.	° F.	° F.
1.....	43.7	62.6	71.2	48.7
2.....	43.9	66.7	77.2	52.0
3.....	43.0	63.3	70.7	50.0
4.....	43.9	59.0	70.7	48.0
5.....	41.9	64.6	74.7	50.4
6.....	43.0	59.9	71.4	48.6
7.....	43.7	60.6	69.8	48.7
8.....	44.6	60.4	70.2	49.6
9.....	43.0	63.1	70.7	48.7
10.....	44.2	67.6	75.0	52.0
11.....	43.3	64.8	72.1	50.4
12.....	44.2	68.9	77.5	54.9
13.....	46.0	71.4	77.5	54.3
14.....	45.3	67.1	74.3	51.4
15.....	43.7	63.1	73.9	49.8
16.....	43.0	65.5	73.2	51.4
17.....	44.2	61.7	68.2	50.0
18.....	45.3	68.7	77.4	51.3
19.....	43.7	60.8	69.4	48.2
20.....	43.3	57.0	65.3	47.1
21.....	42.1	54.5	65.1	46.0
22.....	40.1	54.9	57.9	43.9
23.....	39.6	50.0	52.9	44.1
24.....	40.1	54.5	61.0	44.2
25.....	41.9	56.1	63.1	46.0
26.....	41.7	55.9	66.7	46.6
27.....	43.0	61.0	70.5	47.3
28.....	41.9	60.8	71.6	48.6
29.....	43.2	63.5	71.4	49.3
30.....	41.7	66.6	74.1	51.8
31.....	41.0	62.8	73.4	49.6

The dry season in La Paz, as throughout Bolivia, coincides with the winter or time of shortest days and lowest temperatures. It begins in May and continues through August, though the weather usually begins to grow warmer in August. Though not unknown, rains are uncommon during the winter, and the days are generally sunny and comfortably warm, except when high winds blow, as they sometimes do in August and September. However, the nights are quite cold, and warm wraps are necessary after sunset even when one sits within doors, except in the few houses that are artificially heated. It seldom snows, and only on exceptional nights does water freeze in the lower parts of the city. Yet the "alto," a thousand feet above, may be covered with a night's fall of snow until well into the day. Flowers bloom in profusion in the gardens of La Paz throughout the winter. Lying as it does in a great basin of the plateau, La Paz is protected against the worst rigors of the climate of the "altiplano," especially against the high, piercing winds that sweep across the exposed "pampa" of the table-land.

The spring begins in September and lasts into November or early December. The rains become increasingly frequent toward the beginning of the summer, or true rainy season, and are at their height in December. However, the rainy season is well under way by November, and in some years before the end of October. It slackens in April, and May is often a rainless month. The summer rains are often in the nature of tropical showers and are usually followed by a rapid clearing of the sky. Sometimes they are accompanied by violent thunderstorms. In May the short Bolivian autumn is at its height, and for those who can endure the chilly nights it is

one of the most pleasant months of the year. For the foreigner May and June are probably the best months of the year for visiting Bolivia, and especially for traveling about the interior.

Oruro, which lies at an altitude of over 12,000 feet, is situated on the edge of a barren plain, where it is exposed to the strong winds that often blow across the plateau, raising blinding dust storms in the city's streets. During the rainy season Oruro presents an especially bleak and desolate appearance, and at this time of the year its climate is particularly forbidding. However, during the sunny days that prevail from May to September the weather in Oruro is quite agreeable, though the nights are always very sharp. The average annual temperature in Oruro is about 50° F.

Largely because of its greater altitude—more than 14,000 feet above sea level—Potosi suffers from a more rigorous climate than any of the larger cities of the "altiplano." Not only is the climate uncomfortably cold at nearly all seasons of the year, but a disagreeable rawness in the air often adds to the discomfort of those who live in the city. The mean annual temperature of Potosi is about 47° F. The thermometer seldom rises above 60° F. in the shade and may fall to 8° below zero.

Uyuni, a small but important railway and trading center of southern Bolivia, has one of the coldest climates in all South America, though its altitude is only 11,972 feet. This is the result of its unprotected location on a wide plain and the presence, to the northwest of the town, of extensive salt marshes. These "salares" serve as a freezing mixture to lower the temperature of the winds that blow across them and over the town. In midwinter the temperature may fall far below zero.

HEALTH CONDITIONS.

With all its diversity of climates there are few positively unhealthy districts in Bolivia. The lack of modern water and sewage systems, and the insanitary habits of the majority of the population, largely account for the high mortality rates of some of the plateau cities. By nature the climate of this region is not unfavorable to human life. The air is pure and for most of the year is very dry. Those who take reasonable precautions against exposure to the abrupt changes of temperature have little to fear from the climate of the "altiplano." However, a severe cold may quickly develop into pneumonia, which, in view of the rarefied atmosphere of these altitudes, is highly dangerous. Foreigners who show the first symptoms of pneumonia are usually hurried at once to Arica or Arequipa.

EFFECT OF HIGH ALTITUDE.

The complaint known as "soroche" or mountain sickness, which affects some travelers on the way into Bolivia, is not dangerous, though very uncomfortable. It is caused by the sudden transition into a high altitude, where there is less oxygen in the atmosphere, and is accompanied by nausea and severe headaches. Sufferers from it sometimes find relief by drinking a brew made from coca leaves. However, most of those who visit Bolivia never have "soroche" at all, or, at most, have it in a very mild form. Those who enter the country by the easy ascent from either Mollendo or Antofagasta are

less liable to be attacked by "soroche" than are those who make the rapid climb from the coast at Arica.

Though persons with weak hearts are generally warned against the high altitudes of the Andean plateau, the danger from this source has probably been greatly exaggerated. However, the heart beat increases abnormally in these regions, and, for some time after one arrives, even such physical effort as walking is attended with fatigue and shortness of breath. Those who suffer from heart trouble are advised to abstain from excessive exertion, but persons with a normal heart are able to play tennis and dance and indulge in similar forms of exercise after a short stay in the country.

The effect of the high altitude on the nerves of all but the most phlegmatic is very marked. Nerves tend to be more "high strung," and may finally suffer from a continuous state of tension. This is especially true in the large mining camps. These are usually situated above the general level of the plateau and contain few means of diversion, so that those who live there sometimes find it advisable to make a trip to the coast for a period of relaxation. On the other hand, those who have resided for a considerable time on the plateau often experience a feeling of drowsiness or even general derangement for a time after returning to sea level until their system is readjusted to the heavier atmosphere of the lower altitude.

MEDICAL AND SURGICAL SERVICE AVAILABLE.

Persons visiting Bolivia should be inoculated against both smallpox and typhoid. There are competent foreign-trained physicians in La Paz, and an American hospital is now being installed. Americans in need of surgical attention sometimes go to the great mining camp of Chuquibambilla in Chile, where there are a skilled American surgeon and a modern hospital with trained American nurses. The mining companies operating in Bolivia maintain their own medical staffs and hospitals. Well-equipped drug stores are to be found in all Bolivian cities. The National Government maintains a National Institute of Bacteriology, which has lately done excellent work in inoculating the population against smallpox and typhoid. Medical attention is supplied gratis to the poor in the larger cities by the "Asistencia Publica."

MORTALITY STATISTICS.

The annual death rate in La Paz is higher than in most South American capitals. In 1911, 528 persons died of typhoid fever in La Paz, and the annual deaths from this source for the four following years were from 30 to 52. Forty-eight died from the same cause in 1919. Deaths from smallpox in La Paz for the five years 1911-1915 were as follows: 1911, 120; 1912, 174; 1913, 96; 1914, 274; 1915, 159. Smallpox caused 84 deaths in 1919. There were 151 deaths from influenza in La Paz in 1919, 38 from pulmonary tuberculosis, 30 from other forms of tuberculosis, and 60 from typhus.

The health conditions of the city of Cochabamba have been notoriously bad, the annual death rate amounting to 50 and even 60 per 1,000. The largest number of deaths result from various infantile diseases (such as intestinal infection, due to infected milk) and from typhoid fever, smallpox, and pneumonia. Deaths from

typhoid in 1908 numbered 137, and the usual death rate from this disease is from 40 to 80. In Cochabamba 784 died from smallpox in 1906 and 275 in 1910, but there were only 3 deaths from the same cause in 1908 and 1913, and only 1 in 1909.

A comprehensive program of sanitary works for the most important cities of Bolivia is now under way. This work is in charge of a large American engineering company, which has contracts under consideration, or actually signed, covering La Paz, Cochabamba, Oruro, Potosí, and Sucre.

MALARIAL FEVERS.

Malarial fevers are prevalent in many of the Andean valleys and in widely scattered districts throughout eastern Bolivia. Known in different localities as "paludismo," or swamp fever, as "terciana," or tertian fever, as "chuchu," or under the more familiar name of malaria, it is everywhere the same disease, with the same cause and the same lingering results. In ill-drained regions where mosquitoes flourish, malaria is nearly always endemic. It is common in some of the mountain valleys below La Paz and is found at its worst in the fine valley of Mizque between Cochabamba and Sucre. This fertile district formerly enjoyed considerable prosperity and importance, but its population has been decimated by the fever or has emigrated to more healthful regions, and its industrial importance has greatly declined. However, drainage works that could be easily carried out would extirpate the mosquito and his work and restore the valley to its former condition. In parts of the Territory of Colonias, in large areas of the Beni, in eastern Santa Cruz (especially in some of the Chiquitos valleys), and in the Chaco, malarial fevers are all too common. Certain centers, such as Villa Bella in the Beni, San José in Chiquitos, Puerto Suarez on the eastern border, and Puerto Montes on the middle Pilcomayo, are particularly subject to them. However, the draining off of standing water or the clearing of swampy woods would go far to free most such localities of this plague of fever. The writer recalls an experience in the Mizque Valley, where he asked his host, who bore all the marks of long-standing "terciana," whether there were much malaria about. "It is everywhere" was the answer—and to the rear of his house were two open pools of stagnant water from which swarms of mosquitoes were rising.

AMAZON REGION—DEPARTMENT OF SANTA CRUZ.

Though the Amazon region has a reputation for insalubrity, much of this ill fame is due to the disregard of the most fundamental rules of tropical hygiene by the majority of those who live in that area. Those who observe these rules can live there for years without serious detriment to their health, though a certain amount of anemia is almost inevitable. The most common complaint here is "paludismo," or swamp fever, which caused such ravages among the first builders of the Madeira-Mamore Railway. However, the use of quinine and mosquito nets and care in the drinking of water are usually sufficient safeguards against malarial attacks. There is also considerable beri-beri and dysentery in some districts, and hookworm is prevalent in parts. Tuberculosis is common among the

rubber workers, and in 1914 there was a plague of smallpox in the Beni district. Malnutrition, exposure, intemperate living, and failure to use the necessary precautions against mosquitoes are the principal causes of sickness in the Amazonian lowlands. The drainage of swamps in the vicinity of the settlements would do much to improve health conditions, as the large bodies of stagnant water, which remain after the rainy season and the return of the rivers to their beds, are fruitful sources of malarial fevers. Some towns are much more favorably situated in this regard than others, Villa Bella, for example, being much more unhealthful than Riberalta, which lies on high ground above the flood level of the Beni. The Madeira-Mamore Railway maintains a well-equipped hospital, manned by American doctors, at Candelaria, near Porto Velho.

The climate in most parts of the Department of Santa Cruz is notably healthful, though the habits of most of the natives are extremely insanitary. Malaria has been prevalent in certain localities and there have been occasional outbreaks of dysentery and smallpox, but, in general, health conditions compare very favorably with those of any part of South America. Some districts, as about Santiago de Chiquitos in the Territory of Oriente, have an almost ideal climate.

POPULATION AND LIVING CONDITIONS.

CENSUS STATISTICS.

According to the last census, taken in 1900, the population of Bolivia was 1,781,666. Previous censuses gave the following results: 1831, 1,088,768; 1835, 1,060,777; 1845, 1,378,896; 1854, 2,326,126; 1882, 1,172,156. The course of fluctuations in the population as illustrated by these figures can only be explained by their utter lack of accuracy. A truly scientific census has never been taken. Moreover, the wide dispersion of much of the Indian population and the notorious hostility of the Indians to census takers make the computing of their numbers extremely difficult. An attempt is to be made at a more accurate census on modern lines in 1920-21, but the published results can scarcely be expected before 1923. In the opinion of the writer, the present population of the Republic is probably close to 2,000,000.

The vast majority of the population lives on the plateau, where the mining industry is concentrated. The population by Departments and Provinces in 1900 was as follows (Provinces are indented under Departments):

La Paz ¹	397,643	Oruro.....	86,081
City and suburbs.....	54,713	Cercado.....	37,595
Cercado.....	20,610	Paria.....	29,675
Pacajes.....	72,120	Carangas.....	18,811
Munecas.....	38,987	Cochabamba.....	326,153
Sur Yungas.....	15,021	Cercado.....	36,222
Nor Yungas.....	12,211	Tapacari.....	50,924
Sicasica.....	26,136	Punata.....	48,880
Caupolican.....	14,108	Tarata.....	48,085
Larecaja.....	21,319	Arque.....	34,236
Loaiza.....	15,809	Ayopaya.....	29,781
Inquisivi.....	21,050	Chapare.....	24,875
Omasuyos.....	85,559	Totora.....	22,829

¹ Additions, in revised figures, brought the population of the Department of La Paz up to 423,800. Certain additions were also made for Oruro.

Cochabamba—Continued.		Santa Cruz.....	151,062
Mizque.....	15,785	Cercado.....	39,285
Campero.....	14,536	Vallegrande.....	46,252
Potosi.....	323,615	Cordillera.....	33,210
Frias.....	49,998	Velasco.....	24,550
Charcas.....	54,424	Chiquitos.....	7,765
Linares.....	51,461	Tarija.....	67,887
Chayanta.....	54,016	Cercado.....	17,085
Nor Chichas.....	40,512	Mendez.....	13,799
Sur Chichas.....	37,772	Avilez.....	10,275
Porco.....	26,260	Gran Chaco.....	9,215
Nor Lipez.....	6,565	Salinas.....	8,836
Sur Lipez.....	2,607	Arce.....	8,677
Chuquisaca.....	196,434	El Beni.....	25,119
Sucre.....	20,907	Mojos.....	9,047
Yamparaez.....	50,929	Yacuma.....	6,760
Tomina.....	52,685	Itenez.....	5,750
Cinti.....	41,447	Vaca Diez.....	3,562
Azero.....	30,466	Colonias (Territory).....	6,883

The population was officially estimated in 1918 at the following figures:

La Paz.....	734,021	Tarija.....	160,709
Oruro.....	137,336	El Beni.....	50,265
Cochabamba.....	512,590	Colonias.....	49,761
Potosi.....	515,458	Chaco.....	13,272
Chuquisaca.....	319,325		
Santa Cruz.....	327,382	Tota'.....	2,820,119

The census of 1900 gave the white population of the Republic as 231,088, or 14.64 per cent of the total population. However, some who have a certain admixture of Indian blood, but socially belong to the upper classes, declare themselves as whites in the census returns. The percentage of whites varies greatly between different parts of the country, being highest in Santa Cruz (28.37 per cent) and lowest in Potosi (6.66 per cent).

WHITE ELEMENT IN POPULATION.

The character of the white element in the population is largely the result of its Spanish heritage, modified by long residence in the peculiar environment of the Bolivian Plateau. Railways and foreign travel and better education have done much to break down the provincialism that was so long common to Bolivians and that was only the natural consequence of the country's inland position. This provincialism was also partly due to the isolation of the different centers of population within the Republic. The long distances and difficult communications between the important cities of the country not only developed strong particularistic sentiments that were an obstacle to political unity and a factor for unrest, but positive differences between the temperament of the population of different sections. Thus the typical Paceño developed certain characteristics that are quite distinguishable from some of the qualities of the Orureño, the Cochabambino, the Potosino, the Sucreño, or the Cruceño. Some of these are more enterprising or practical or refined or excitable than others. However, the upper-class Bolivians of all parts of the Republic have the best traits of the Spanish character in a high degree. They are nearly always courteous and considerate, and are sincerely hospitable and friendly to natives and foreigners alike.

"CHOLOS," OF MIXED WHITE AND INDIAN BLOOD.

The mestizos or mixed breeds, locally known as "cholos," are an ethnic factor of increasing importance in Bolivia. Their proportion also differs greatly in different parts of the country, ranging from 8.13 per cent of the population in the Department of La Paz to 51.54 per cent in Cochabamba, where the amalgamation of the two races has proceeded furthest. According to the census of 1900 the number of mestizos was 484,611, or 29.45 per cent of the total population.

The "cholo" is the product of the mixture of the Spaniard and the Indian, and so shares to a certain extent the qualities of both, though he has some characteristics that are common to hybrid races in general. He generally lacks initiative and persistence, and only too often a strict regard for responsibility. He is prone to be verbose and is often eloquent. He is rather fond of display and is inclined to be satisfied with superficial attainments. However, he is vastly superior in intelligence and adaptability to the Indian, and has, moreover, assumed much of the agreeable manner of the white. He also has the sense of humor that is so noticeably lacking in the Indian.

The "cholo" occupies a very important place in both the industrial and the political life of the nation. He furnishes nearly all the skilled labor and some of the unskilled. The major-domos, or superintendents, of the large landed estates are usually "cholos," and many "cholos" are themselves independent proprietors. Nearly all the small shopkeepers are "cholos" or "cholas." For the women of this class, who are uncommonly shrewd and independent, are much given to the management of small businesses. Most of the stalls in the public markets are kept by them, and most of the purveyors of liquors are "cholas." The class of household servants is also largely recruited from them. There are different castes or gradations of the general class of "cholas," depending on the degree of their prosperity, the social standing of their occupation, or the proportion of white blood in their veins. The high and the low class "cholas" are generally distinguishable by their dress, the former wearing the high, polished white hat, bright-colored "manta" or shawl (often of silk), and high buttoned boots that are so familiar a sight in La Paz. The garb of the low-class "chola" shades off, like her complexion, until it approximates that of her Indian cousin. All classes of "cholas" wear several heavy skirts, made of bright-colored baize or "bayeta" and superimposed one over the other, often to a very considerable thickness.

In politics the great mass of voters come from the class of "cholos," and most of the subordinate posts in the Government are filled by men of this class. Some of them have risen to high places in public life and have occupied positions in the national ministries.

INDIANS.

The census of 1900 gave the Indian population of Bolivia as 792,850, or 48.42 per cent of the entire population. The proportion was highest in the Department of La Paz (75.61 per cent) and lowest in that of Cochabamba (23.04 per cent). The great majority of the Indians of Bolivia belong to two races—the Aymará and the Quechua, both of which inhabit the "altiplano."

AYMARÁS.

The habitat of the Aymará is the plateau region of the Department of La Paz and the northern part of the Department of Oruro. They are a people of rugged appearance, and many are of robust build, being above the average of the Indian races in stature. The hard struggle for existence eliminates the weaker individuals early in life, and those who survive the first trying years are sturdy and well fitted for coping with their rigorous environment. Their language, which may be heard in the streets of La Paz, is harsh and guttural and is still in a rudimentary state of development.

The Aymará is disposed to be sullen and taciturn and has an air of habitual melancholy. Though normally servile in his attitude toward his white superiors, he is given to vindictive revolts when he feels that his communal or traditional rights have been too long violated. He is then cruel and relentless. Local risings of the "indiada" occur every few years and are put down by the Government forces. The last of these troubles occurred in July, 1920, in the neighborhood of Lake Titicaca. Because of his fighting qualities, the Aymará (with "cholos" of Aymará admixture) forms the backbone of the Bolivian Army. He is given to the drinking of liquor; only when he is under its influence does he laugh or become loquacious and communicative. His intelligence, which is naturally dwarfed by his environment and the monotony of his surroundings, is further impaired by his constant use of coca. Though the chewing of the strongly narcotic coca leaves endows him with inordinate powers of enduring fatigue and hunger, it is undoubtedly a factor for the physical degeneration of the race.

The normal environment in which the Aymará lives, and which accounts for his peculiar temperament, is highly unfavorable to human life, when unaided by the resources of modern civilization, which are beyond the reach of the Indian. The Aymará's existence has been a continuous struggle against the environment of the bleak and inhospitable plateau—against cold and hunger and the lack of oxygen. The hard conditions of life have left little place in him for affection or any other of the finer feelings. One of his strongest sentiments is his ineradicable attachment to the "ayllu," the community in which he was born and in which his ancestors lived. So strong is this attachment to his traditional home that he refuses to migrate to the warmer valleys beyond the Andes where the conditions of life are much more favorable. His music is in accord with the dreary circumstances of his life and consists of the melancholy and monotonous minor notes of the "quina" or reed flute. His few songs are mournful chants that are seldom heard.

The country-dwelling Aymará lives in a hut made of mud or stones, where he sleeps on a sheep pelt on the bare floor or on the floor itself. His clothing consists of a peaked woolen cap with long "ear flaps" that hang down over the side of his face; a homespun woolen poncho, generally of great age; rough trousers split part way up the back of the leg; and crude sandals, which he wears over the rocky roads of the mountain country or the sharp cobblestones of La Paz, but which are generally discarded. His sparse diet is made up of potatoes, usually in the desiccated form known as "chuno," a stew made of vegetables and barley, or "quinua," and parched

FIG. 2.—AYMARA INDIAN TYPE, LA PAZ.

FIG. 3.—"CHOLA" TYPE, LA PAZ.

FIG. 4.—ALPACAS IN THE CARANGAS DISTRICT.

FIG. 5.—LLAMA TRAIN NEAR LA PAZ.

corn. He eats little meat or bread, though he may kill a sheep to celebrate a fiesta.

The Aymará is the agricultural laborer of the "altiplano," though seldom a proprietor, save where the ancient communal tenure has been permitted to survive in some distant localities. He also does the rough work of the city and can always be seen carrying burdens about the streets of La Paz. He cares for the herds and flocks of the plateau and drives the pack trains of mules, burros, or llamas from place to place. He is often the owner of small flocks of sheep or droves of pack animals, whose life he shares in a strange intimacy. Most of the workers in the mines are also drawn from his class. He has no place in the political life of the nation, and sharp barriers of caste separate him from those who own and rule the country. Even the majority of the "cholos," who have sprung from a mixture of his race with the Spaniard, look down on him and refuse to speak his language.

QUECHUAS.

The much more numerous Quechua race is spread over a wide area from Ecuador south into Argentina and Chile, as attested by such names as Cajabamba in the former country, Catamarca in Argentina, and Chuquicamata in Chile. In Bolivia the Quechuas constitute the aboriginal race in part of the Department of Oruro and in Cochabamba, Chuquisaca, and Potosi. Their language forms one of the great lingual stocks of South America and is much more highly developed than the rude speech of the Aymarás.

The Quechua is smaller in stature than the Aymará, less robust and of finer features, some of the men of the Sucre district being of quite handsome appearance. However, the Aymará "cholos," particularly the "cholas" of La Paz, are generally superior, as regards stamina and appearance, to the majority of the Quechua mixed breeds.

There is a vast difference in the character of the two races. The Aymará, at the time of the Spanish conquest, had lived under the Incaic dominion only a comparatively short time and still lived in a semibarbarous state. The Quechua, on the other hand, had long been subjected to the peculiar civilizing régime of the Incas, which had given him certain fundamental elements of culture and a settled order of society, even though it had deprived him of all personal initiative. The Incaic institutions have disappeared, save in the survival of a few customs, but the Quechua still preserves in his temper much of the heritage of pre-Spanish days. He is eminently docile and passive, whereas the submissiveness of the Aymará can never be taken for granted. He also is taciturn and uncommunicative, but never defiantly or sullenly so. His temper is in general much gentler and kindlier than that of the Aymará. However, he has the same propensity for drink, which he shares with the other Indian races of South America. Except in the high mountain districts of Oruro and Potosi, he prefers the milder "chicha" to the strong liquors that serve the Aymará. This is particularly true in the valleys of Cochabamba and Chuquisaca, where large areas of corn are devoted to the making of "chicha." In the city of Cochabamba there are 1,400 "chicherías," or shops where "chicha" is dispensed. This is at the rate of about 1 to 25 persons in the population.

The Quechua's manner of life varies considerably in different districts. In the valleys of Cochabamba and Sucre, which are the favorite habitats of the race, it is much superior to the conditions in the more unfavorable environment of the Oruro and Potosi highlands. In the former he is an agriculturist, working in a good soil and a temperate climate. There he has enough to eat of corn and vegetables and often of meat, and the climate makes few demands in the way of clothing and housing. In Potosi and Oruro he is a worker in the mines, or farms the barren and rocky soil of the mountains. Here his conditions of life are much like those of the Aymará of the La Paz "altiplano."

Like the Aymará he lives apart from the political life of the Republic but is less esteemed as a soldier. Yet with the Aymará he forms the very basis of the whole economic life of the country.

MINOR TRIBES.

Besides the two principal Indian peoples, there are a large number of minor tribes. These vary in degree of civilization from the savages of the Monte Grande in the Santa Cruz country and the fierce Siriones of the upper Mamore forests to the domesticated and peaceful natives of the Yungas, the Chiriguano on the western side of the Chaco, and some isolated remnants of tribes in the plateau Provinces of Carangas and Pacajes. Most of these tribes are scattered over the eastern plains from the lower Beni around by the Mamore and Itenez Basins and the Chiquitos highlands into the Chaco and the lower regions of Chuquisaca and Tarija. Some, like the Guarayos of Nullo de Chavez, the Yuracares of the Mamore country, and the Indians along the Madidi, are under the influence of Franciscan missionaries. Others roam the forests or plains in a state of unmitigated barbarism. Still others such as the Chiquitanos are civilized Indians, who have mingled their blood to a large extent with that of the whites. The Chiriguano are a peaceful race of Guaraní stock who inhabit the country between Santa Cruz and the Argentine border.

NEGROES.

The Negro population of Bolivia is small and of insignificant importance in the national life. It amounted to 3,945 persons in 1900 and is largely concentrated in the warm valleys of the Yungas of La Paz and in the Beni. The Department with the smallest proportion of Negroes is Potosi, with but 0.03 per cent of its population in 1900. The census of 1900 gave 121,116 persons, or 7.31 per cent of the population of the Republic, as "unclassified."

FOREIGN POPULATION.

The census of 1900 gave the foreign population of the Republic by nationalities as follows:

Nationality.	Number.	Percent- age.	Nationality.	Number.	Percent- age.
Peruvians.....	2,571	31.33	Germans.....	295	3.98
Argentiniens.....	1,368	18.53	French.....	279	3.75
Chileans.....	660	8.89	Austrians.....	177	2.38
Italians.....	529	7.36	British.....	141	1.80
Brazilians.....	172	6.46	Americans.....	61	.82
Spaniards.....	120	5.69			

The most numerous foreign element in Bolivia consists of persons born in the neighboring Republics. These include the large Peruvian colony in La Paz (somewhat diminished after the riots of March, 1920), the Chileans employed in the mines and in business, the Argentinians in Tarija, and the Brazilians in the lower Beni and Colonias. Most of the British in the country are employed by the Bolivia Railway, are connected with British commercial houses, or are mining engineers. The Germans are employees of trading houses or of the German bank. There are also considerable Spanish and Italian colonies in the cities, most of whose members are engaged as skilled laborers or in small businesses, though some important business houses in La Paz are owned by Spaniards. There is now a fairly large colony of Jugoslavs in Oruro and Potosi engaged in the grocery and general merchandise business. There are some settlements of Japanese in the Beni and a few Japanese barbers and bazaar keepers scattered about the plateau.

The American population in Bolivia now numbers about 350. The largest single aggregation consists of the employees of a large mining company. Others are engaged in other mining enterprises or in mercantile business. Some are employed as teachers in mission schools, and about a dozen are located as colonists in eastern Bolivia.

GOVERNMENT.

The Government of Bolivia is based on a constitution which was adopted in 1880. Previously the form of government had been altered several times by the dictators who so often governed the country. As in Chile and Peru, the Government is a centralized Republic, as opposed to the federalism of Argentina and Brazil. Voting is limited to male citizens over 21 years of age who can read and write and who possess an independent income of at least 200 bolivianos per year. Domestic servants are barred from voting.

The scheme of government is somewhat as illustrated by the following outline:

NATIONAL.

Executive:

- President.
- Vice Presidents (two).
- Ministers—
 - Government and Justice.
 - Foreign Affairs and Worship.
 - Finance.
 - Industry and Public Works.
 - Public Instruction and Agriculture.
 - War and Colonization.

Legislative:

- Congress—
 - Senate.
 - Chamber of Deputies.

Judicial:

- Supreme Court.
- Attorney General.

LOCAL.

Departments:

- Executive—Prefect.
- Judicial—
 - District court.
 - District attorney.
 - Judges of first instance.

Provinces:

Executive—Subprefect.

Judicial—Judges of first instance.

Cantons:

Executive—"Corregidor."

Cities:

Executive—President of municipal council.

Legislative—Municipal council.

Judicial—Parish judges or "alcaldes."

Indian communities:

Executive—"Cacique," etc.

EXECUTIVE BRANCH.

As is usual with governments of this class, the presidential office overshadows the other parts of the national administration, though much depends on the force of personality of the President. The President is elected by direct popular vote for a term of years, but may not be reelected until after a lapse of four years, as happened in the case of President Montes. The powers granted to the Chief Executive by the Bolivian constitution are substantially those held by the President of the United States, but the traditions of personal authority are much stronger in the former country.

The Bolivian constitution provides for the extraordinary precaution of two vice presidents, one of whom presides over the national Senate.

The cabinet system is modeled on that in force in most European countries, and is based on the principle of ministerial responsibility. The cabinet thus represents the party in power at the time and is selected from the majority in the Congress. There are six cabinet ministers, as follows: Foreign Affairs and Worship, Finance, Government and Justice, Public Works and Industry, Public Instruction and Agriculture, and War and Colonization. When such diverse interests are represented within a single portfolio, as in some of these cases, it is difficult to coordinate properly the work of the departments of government. The Ministry of Government and Justice, which might be called a Ministry of the Interior, is of great importance in the scheme of government. This office has control over the national elections, the policing of the country, the post-office and telegraph systems, questions of sanitation and hygiene, and, through the prefects and subprefects, it controls the local government of the Departments and Provinces. On its judicial side it has jurisdiction over questions pertaining to the courts, the practice of law, and the national penal system. The Ministry of Public Works (Fomento) and Industry has control over railways, river and lake navigation, roads and bridges, public buildings, public utilities in the cities (with cooperation of the municipalities), the promotion and regulation of commerce and industries, mining, the government monopolies, and patents and trade-marks.

LEGISLATIVE AND JUDICIAL AUTHORITY.

The national legislative body consists of a Congress composed of a Senate and a Chamber of Deputies. The annual session of Congress begins on August 6 and lasts for 60 days, though the President is empowered to call a special session to deal with any extraordinary and urgent matters. The senators are elected by popular vote for a

term of six years. There are two from each Department, so that the entire membership of the Senate numbers 16. The deputies are elected for four years. The total membership of the lower house amounts to 70.

The national judiciary consists of a Supreme Court of seven members, who are elected by the Chamber of Deputies from lists submitted by the Senate. The judges hold office for a period of 10 years. The jurisdiction of the court is limited to the adjudication of cases appealed to it from the district or departmental courts.

The Supreme Court sits at Sucre, being the only branch of the National Government which that city has retained. Though Sucre is still legally the capital of the Republic, the actual seat of government has been located at La Paz since 1900. La Paz has advantages of greater population, commercial importance, and accessibility, which justify its position as the center of government, in spite of Sucre's traditional claims and the amenities of its climate and its cultured aristocracy.

ADMINISTRATIVE DIVISIONS.

Bolivia consists of eight Departments, which are purely administrative divisions and not self-governing states, as in the federal republics of South America. Little autonomy is permitted in departmental administration, but the government of the Departments is largely directed from the Ministry of Gobierno, or Government, in La Paz, to which the prefects are responsible. Each Department, is administered by a prefect, who is appointed by the President for four years. The prefect is not only the head of the civil government of the Department, with very large authority, but, as commandant-general, is in control of the military forces of the district.

The Departments are divided into Provinces, of which there are 66 in the entire Republic. The present list of Provinces is as follows:

Department of La Paz (14).—Murillo, Omasuyos, Los Andes, Larecaja, Camacho, Muncas, Caupolicán, Nor Yungas, Sur Yungas, Inquisivi, Loayza, Sicasica, Pacajes, Ingavi.

Department of Cochabamba (14).—Cercado, Ayopaya, Chapare, Punata, Arani, Tarata, Cliza, Totorá, Mizque, Campero, Capinota, Arque, Tapacari, Quillacollo.

Department of Oruro (4).—Cercado, Carangas, Poopo, Abaroa.

Department of Chuquisaca (7).—Oropesa, Yamparaez, Azero, Tomina, Zudanez, Azurduy, Cinti.

Department of Potosí (10).—Cercado (Frias), Charcas, Bustillo, Chayanta, Nor Lipez, Sur Lipez, Porco, Linares, Nor Chichas, Sur Chichas.

Department of Tarija (6).—Cercado, Méndez, Avilez, Arce, O'Connor, Gran Chaco.

Department of Santa Cruz (7).—Cercado, Sara, Nuflo de Chavez, Velasco, Chiquitos, Cordillera, Vallegrande.

Department of El Beni (4).—Cercado (Mojos), Yacuma, Itenez, Vaca Díez.

The Provinces named "Cercado" comprise the districts about the capitals of the Departments. The Provinces are administered by subprefects, who are appointed by the President for four years, but who are under the direct control of the prefect.

The Provinces are in turn subdivided into cantons. An official known by the old Spanish title of "corregidor" is placed over each canton. He is named by the prefect and holds office for one year. Still smaller districts are administered by an official known as an "alcalde de campana."

The government of towns and cities is regulated by the Organic Law of Municipalities, which was issued November 21, 1887, and by subsequent amendments to the basic law. According to this law each city has a municipal council, whose president holds a position largely analogous to that of mayor in the United States. The provincial capitals are administered by "juntas municipales" of 5 members. The municipal governments have authority over purely local affairs, such as markets, paving, police, lighting, and primary instruction, but Bolivian cities do not enjoy the same degree of self-government that is exercised in the United States.

The Bolivian Government has left much of the administration of Indian communities to local Indian officials, who are, however, more or less responsible to the "corregidor" or subprefect of the district. These native authorities, whose position is symbolized by an ornamental silver cane, are known by the Indian names "cacique," "curaca," "mallcu," or "ilicata," or by the old Spanish titles of "alcalde" and "regidor." These officials often exert considerable authority over the community which they head.

POLITICAL PARTIES.

There are two principal parties in Bolivian politics, the Liberal and the Republican. A third party, the Radical, is of little importance. The Liberal party was in power from 1900, when Gen. Pando began his first term as President, until July, 1920. During much of this period, great material progress was made. Railways were built, the mining industry attained a degree of development never reached before, and the country's credit in the international money market was firmly established and maintained through the trying times of the early years of the war. Much of this progress was due to the leadership of Gen. Ismael Montes, who was twice President of the Republic.

On the early morning of July 12, 1920, the Liberal Government of President José Gutiérrez Guerra was overthrown by a military coup d'état organized in the interests of the Republican party. The revolution was an almost bloodless one. Normal conditions were quickly restored, and a Committee of Government, consisting of three prominent Republican leaders, took charge of the organization of the new régime. The new Government quickly confirmed all existing concessions, contracts, and other arrangements made by the former Liberal administration with foreigners and foreign governments.

In the election held on January 29, 1921, Bautista Saavedra was elected President of the Republic.

Basically there is not much difference between the platforms of the two principal parties.

The quality of men in high official positions is very noticeable. For real public spirit and intelligence, the composition of the national Congress will compare favorably with that in the more advanced Republics of South America, although, as in most Latin American countries, certain of the members fail to understand adequately the industrial needs of the nation.

However, the unsatisfactory quality of local officials persists. "Corregidores," and frequently subprefects, have not a sufficiently

high sense of the responsibility of their positions. These officials are usually too far from the corrective influence of La Paz or the restraint that the prefect might exercise over them.

DIPLOMATIC RELATIONS.

Bolivia maintains ministers in the United States, Great Britain, France, Argentina, Chile, Peru, Brazil, Paraguay and Uruguay, Japan, and one for Colombia, Venezuela, and Ecuador. In the United States there are consuls general in New York and San Francisco, and officers of consular rank in Philadelphia, Kansas City, Mo., New Orleans, Los Angeles, Seattle, and Boston. There are vice consuls in Norfolk, Mobile, Newport News, and Cincinnati.

The United States is represented in Bolivia by a minister. There are also an American consul and vice consul in La Paz. The La Paz consulate is located in the Edificio Taborga on Calle Socabaya.

NATIONAL ARMY.

The Bolivian Army is based on the theory of universal military service, which, however, is modified by the practice of conscription by lot, whereby those called up each year for service are required to draw lots. All males between the ages of 19 and 50 are declared subject to military service. Exemptions are freely allowed, and, in reality, the principle of universal service has never been rigorously carried out. Moreover, the resources of the Government are not commensurate with the cost of maintaining a large standing army.

A law of December 15, 1915, provided for a permanent force of 3,577 men. The ordinary peace strength of the army amounts to about 3,500 men, with a probable reserve of about 15,000. The army consists of four regiments of infantry, one regiment of cavalry of 500 men, one regiment of field artillery, one regiment of mountain artillery, and one machine-gun regiment of 150 men.

The army is German-trained, and the uniform of the officers is very German in appearance. The rifle of the infantry is the Mauser. Most of the artillery is of Schneider-Creusot type, and the machine guns are of Krupp make.

The principal garrisons are stationed at Viacha, La Paz, Guaqui, Oruro, and Sucre. There are also small garrisons at Cobija (Colonias), Riberalta (Beni), Puerto Suarez (Oriente), Robore (Chiquitos), and scattered in detachments among small "fortines" or posts along the lower Pilcomayo River.

The chief authority in military matters is the Minister of War. Operations are directed by an Estado Mayor, or General Staff. The country is divided into military zones, each under a commandant. The budget of 1920 provided for 11,316,494 bolivianos for the military establishment out of a total budget of 53,629,120 bolivianos.

EDUCATION AND INTELLECTUAL LIFE.

In a country with the large Indian and mixed-breed population of Bolivia, the problem of popular education is of primary importance. For a long time the idea prevailed that it was unnecessary and inadvisable to educate the masses, and only a very small percentage of the population was able to read and write. However, this condition coincided with an era of great industrial inefficiency and political

turbulence, and for two decades the nation's leaders have seen the necessity of giving the mass of the people at least an elementary instruction that would better fit them as workers and citizens. A few progressive Ministers of Public Instruction have done much to modernize the public-school system, and, though they have had to struggle against inertia, conservatism, and lack of funds, their work has had very gratifying results in the spread of literacy among the people. Very much remains to be done, but the people themselves have awakened to the value of education, and each town now has its public school, though this is often inadequately housed and equipped.

According to the census of 1900, the percentage of illiteracy throughout the Republic was 84. The proportion of literacy was highest in Santa Cruz (59 per cent) and lowest in Potosi (8 per cent). The proportion of illiteracy has probably fallen by now to 70 per cent.

PUBLIC-SCHOOL SYSTEM.

The public-school system in Bolivia is under the direction of the Ministry of Public Instruction. The national budget for 1920 provided for the expenditure of 4,644,686 bolivianos for public education. The increase in the budget for public instruction since 1900 is illustrated by the following figures:

	Bolivianos.		Bolivianos.
1900.....	382,724	1910.....	1,497,643
1901.....	392,784	1911.....	1,755,876
1902.....	206,495	1912.....	1,766,009
1903.....	128,320	1913.....	2,447,950
1904.....	109,800	1914.....	2,562,468
1905.....	884,816	1915.....	2,673,326
1906.....	1,014,392	1916.....	2,001,831
1907.....	1,459,305	1917.....	2,638,662
1908.....	1,833,904	1918.....	3,020,672
1909.....	1,939,804		

The small appropriations for 1902-1904 were due to the large expenses incurred by the Government in the Acre contest against the Brazilians. The decline in 1916 resulted from the falling off of the national revenues caused by the World War. Salaries in the public school system range from 600 bolivianos a year for teachers of some of the village schools to 12,000 bolivianos for the Minister of Public Instruction. Examples of other salaries are:

- Teachers in high schools, 1,200 to 4,200 bolivianos; average, 2,400 to 3,000 bolivianos.
- Principals of high schools, 3,600 bolivianos (Potosi and Tarija) to 8,400 bolivianos (Sucre).
- Directors of normal schools, 7,200 bolivianos.
- Principals of primary and intermediate schools:
 - Cities, 3,600 to 4,800 bolivianos.
 - Towns, 1,200 to 2,400 bolivianos.
- Teachers in primary and intermediate schools:
 - Cities, 1,200 to 2,000 bolivianos.
 - Towns, 600 to 1,200 bolivianos.

Schools are classified according as they are maintained by the National Government or by the municipalities. The former are known as fiscal schools, in distinction from the municipal schools. The number of fiscal schools in the Republic during each year from 1900 to 1918 was as follows: 1900, 84; 1901, 109; 1902, 123; 1903, 64;

1904, 63; 1905, 95; 1906, 170; 1907, 193; 1908, 195; 1909, 222; 1910, 187; 1911, 262; 1912, 265; 1913, 474; 1914, 612; 1915, 540; 1916, 430; 1917, 477; 1918, 450. A large number of schools were closed after 1914 because of the shortage of funds that resulted from the decline of import and export duties following the beginning of the war in Europe.

The enrollment in all classes of schools, both public and private, in 1918 was as follows:

Districts.	Primary.	Secondary.	Higher.	Normal.	Special.	Total.
Cochabamba.....	14,481	529	119	44	182	15,355
La Paz.....	10,260	792	232	130	960	12,374
Santa Cruz.....	9,528	334	85	.....	.....	9,947
Potosi.....	7,538	180	54	30	.....	7,802
Chuquisaca.....	4,821	377	170	127	155	5,650
Tarija.....	2,274	93	32	.....	31	2,430
Oruro.....	2,677	179	33	.....	40	2,929
Beni.....	2,204	75	.....	.....	.....	2,279
Total.....	53,783	2,559	725	331	1,368	58,766

PRIMARY INSTRUCTION.

The Bolivian constitution declares that "primary instruction is free and obligatory." Though only a distant approximation has been made to this ideal, an effort is being made to give the mass of the "cholo" population, as well as the children of white families, the benefits of primary schooling, especially a knowledge of reading and writing and the elements of arithmetic. A few "escuelas de indigenas," or Indian schools, have also been established. The registration in primary and intermediate schools throughout Bolivia in 1918 was as follows:

Districts.	Capitals of Departments.			Provinces.		Total.
	Fiscal.	Municipal.	Private.	Fiscal.	Municipal and private.	
Cochabamba.....	772	3,051	767	2,138	8,253	14,981
La Paz.....	1,877	1,347	1,039	5,632	365	10,260
Santa Cruz.....	1,010	652	277	3,750	3,839	9,528
Potosi.....	475	1,161	620	3,085	1,377	6,718
Chuquisaca.....	834	426	937	1,312	1,312	4,821
Oruro.....	744	781	330	821	68	2,744
Tarija.....	477	413	206	1,234	950	3,280
Beni.....	496	35	.....	1,001	669	2,201
Total.....	6,685	7,866	4,176	18,973	16,833	54,533

The percentage of daily attendance is highest in the Department of Cochabamba (93 per cent) and lowest in those of Tarija (68 per cent) and La Paz (72 per cent). Two hundred and thirty-three teachers were employed in the fiscal primary schools in the cities, and more than 520 in the village and rural schools of the Provinces.

SECONDARY INSTRUCTION.

Secondary instruction is furnished by the national "colegios," or high schools, and by a number of church schools. Though more democratized than formerly, the secondary schools are still operated largely in the interests of the upper classes, and little attempt is made to coordinate their work with that of the elementary schools. Of boys' public high schools there are two in Cochabamba (Bolívar² and Sucre), one in La Paz (Ayacucho), one in Potosí (Pichincha), one in Sucre (Junín), one in Oruro (Bolívar), one in Tarija (San Luis), and one each in Santa Cruz and Trinidad. There are girls' high schools in La Paz, Sucre, Santa Cruz, and Trinidad. The enrollment in the public and private secondary schools in 1918 was as follows:

Districts.	Public.		Private.	Total.
	Boys.	Girls.		
La Paz.....	373	105	311	792
Cochabamba.....	476	.....	53	529
Chuquisaca.....	162	50	165	377
Santa Cruz.....	212	11	111	334
Potosí.....	180	.....	.....	180
Oruro.....	179	.....	.....	179
Tarija.....	93	.....	.....	93
Beni.....	67	9	.....	76
Total.....	1,742	175	643	2,560

Some of these schools are well housed, particularly the Colegio Ayacucho, of La Paz. The course of study includes such subjects as modern languages (especially English and French), pure sciences (including chemistry and physics), world and national history.

PRIVATE SCHOOLS MAINTAINED BY RELIGIOUS ORGANIZATIONS.

Two of the best private schools are those known as the American Institutes of La Paz and Cochabamba, which are operated under the auspices of the Methodist Church. These schools maintain courses from kindergarten through high school, and each has about 300 pupils enrolled in all grades. There are also a number of schools conducted by various Catholic orders, including the Jesuits and Franciscans. The Jesuit Academy in La Paz has about 230 boys enrolled.

VOCATIONAL TRAINING.

A remarkable impetus has been given during the last few years to practical or vocational education in Bolivia. Schools of arts and crafts, or "artes y oficios," are now found in the important cities. Though they are generally lacking in equipment and properly trained instructors, the necessary framework and impulse already exist as a basis for future work. In 1918 the registration in these schools in La Paz, Cochabamba, and Sucre was, respectively, 206, 86, and 155. A school of the same kind has been recently established in Potosí. The School of Applied Arts in La Paz had an enrollment in 1918 of 160. The Salesian Brothers conduct a series of trade schools known

² The words in parentheses are the names of the schools.

as the "Colegios de Don Bosco." These schools are especially designed to train artisans and craftsmen from among boys of the common people. They do particularly good work in training printers.

There is a National School of Commerce in La Paz, which dates from 1910. It had 131 pupils in 1918. A similar school exists in Cochabamba, with 96 enrolled in 1918. The American Institute maintains a commercial course, and its La Paz school has been unable to meet the demand for clerical help in that city.

An agricultural school is in process of formation near Cochabamba, known as the School of Agriculture and Animal Husbandry ("Ganadería"). The foundations of this school, which is situated on the "finca" known as "La Vileta," were laid in 1918. The allied School of Agronomy and Veterinary Science is located within the city of Cochabamba.

One of the most serious needs in public education in Bolivia is the establishment of rural schools, such as exist in the Philippines, which would give the country population the knowledge and ambition to raise the agricultural industry from its present backward state.

A national School of Mines exists at Oruro, which is the mining center of the Republic and the logical location for such an institution. The school has a 4-year course, with about 25 students enrolled. This is lower than the enrollment in 1918, when 40 students were registered. Though it has excellent materials for geological study and opportunities for observation of actual mining operations, the school lacks the necessary machine equipment.

Considerable progress has been made in Bolivia in recent years in the education of teachers for the public schools. A well-equipped Superior Normal Institute in La Paz had an enrollment of 60 in 1918, and the Normal School in Sucre had 127 students in the same year. There are also rural normal schools at Sacaba, Tarata, and Mizque, in the Department of Cochabamba, two in the Department of La Paz, and two in the Department of Potosí. The principal object of this class of normal school is the training of teachers for Indian children.

UNIVERSITIES.

Each Department, with the exception of El Beni, has its own university, all of these institutions being under the direction of the Ministry of Public Instruction. With the exception of La Paz and Chuquisaca (Sucre), these schools consist of only one department, that of law. The University of Sucre or Chuquisaca dates from colonial times, having been founded in 1642, and it was long famous throughout the southern part of South America as an institution of higher learning. It now has faculties of law, medicine, pharmacy, and theology. Of its 170 students in 1918, 52 were enrolled in law, 60 in medicine, and 50 in theology. The University of La Paz has faculties of law, medicine, dentistry, pharmacy, obstetrics, and theology. The total enrollment in 1918 was 232, of which 113 were enrolled in law, 72 in medicine, 13 in dentistry, 8 in pharmacy, 14 in obstetrics, and 12 in theology. The registration in the other departmental universities was as follows: Cochabamba, 115; Santa Cruz, 85; Oruro, 33; Potosí, 54; and Tarija 32. The total number of university students enrolled in Bolivia was 721.

University education in Bolivia is in need of radical reorganization. Too much attention is given to the law in the scheme of university teaching, with the result that the number of lawyers produced is out of all proportion to the needs of the country. On the other hand, the teaching both of the humanities and of engineering is neglected or altogether omitted. The interests of the country would be far better served by the suppression of the small departmental universities and the concentration of effort on the Universities of Sucre and La Paz, or even on the former alone. The principal obstacle to such a change is the highly developed particularism of the different local capitals. With a single university a better quality of instruction and superior library equipment, now so lacking, could be secured. Also, the teaching of applied sciences would be made possible by the acquisition of the necessary laboratory and mechanical equipment, since the funds now dissipated among a number of small institutions could be devoted exclusively to the outfitting and maintenance of a single well-equipped university.

Many Bolivians go abroad to study in the universities and technical schools of the United States, Europe, and Argentina. Those who go to the United States generally enter schools of dentistry, medicine, or engineering. These men carry back to Bolivia not only a valuable special training but the broadening influence of foreign travel and residence as well as a strong sympathy for the country where they have received their education.

GENERAL LITERARY ACTIVITY.

The intellectual activity of contemporary Bolivia has resulted in some very creditable production. Excellent special studies have been produced by members of the Geographical Societies of La Paz and Sucre, and similar studies also appear in the bulletins of the Oficina Nacional de Estadística, or National Statistical Office. Bolivia's interest in boundary problems has resulted in the production of careful works in that field, notably by Eduardo Diez de Medina and Ricardo Mujia. The numerous geographical and scientific writings of Ballivián compare favorably with those of like character in any South American country. Numerous books on public questions have appeared that are of more than temporary value. However, reliable works of national history are scarce, though the "*Historia Financiera de Bolivia*" of Casto Rojas and a detailed study of the administration of Santa Cruz are decidedly above the average of such works. The sociological study of Alcides Arguedas, "*Pueblo Enfermo*," though altogether too pessimistic a picture of national life, contains some perspicacious observations. Bautista Saavedra's "*El Ayllu*" is a thoughtful study of Indian life. Less can be said for the pure literature produced in Bolivia. Except for the rather melancholy novels of Arguedas, "*Vida Criolla*" and "*Raza de Bronce*," the fiction is of quite ephemeral interest. Little poetry or drama of value has been written by Bolivians.

NEWSPAPER PRESS.

The national press has not kept pace with the progress of the nation in other fields. There are too many newspapers in each city, most of whose inhabitants can not read. In February, 1920, there were

six dailies in La Paz, with circulations of 1,000 to 2,500. At the same time there were four dailies in Cochabamba for a population of about 35,000 people, two in Oruro, three in Potosi, and four in Sucre. In March the plant of one of the best dailies in La Paz was destroyed, and after the revolution of July the three Liberal organs suspended publication. Since that time, "La Razón," the Republican daily, whose plant was wrecked in March, has resumed publication. The La Paz papers contain six or eight pages to each issue. Much of this space is filled with the chronicling of local happenings that are really of small importance except in the eyes of the persons directly concerned. Much of it is taken up with advertising and announcements, but first place is generally given to editorials on political questions. For these dailies are, above all, political pamphlets, which defend with great vigor the cause of one or the other of the two principal parties. Foreign telegraphic news occupies only a small place and is usually delayed in transit or relayed from Buenos Aires or some other neighboring capital. Some good writing is done in these journals. Some of the editors are men of real ability, but the newspaper business is in need of radical reorganization.

RELIGION.

According to the Bolivian constitution, "the State recognizes and sustains the Catholic, apostolic, and Roman religion, but permits the public exercise of all other cults." The budget of 1920 provided for the expenditure of 116,740 bolivianos for the State church. The lay Government is represented in the administration of the National Church by the Minister of Worship, who is also Minister of Foreign Affairs. The papal authority in the country is represented by an Internuncio, and the head of the national hierarchy is the Archbishop of Charcas, who resides at Sucre. There are bishops at La Paz, Cochabamba, and Santa Cruz. The total number of secular clergy in Bolivia is about 570. There are 17 conventual establishments, 8 of these being of nuns and 9 of friars. The total membership of the orders is about 510, of whom 280 are nuns and 230 friars.

There are several Franciscan missions in the Beni, Santa Cruz, and the Chaco. These missions are doing an excellent work in bringing the Indian tribes of those regions under the influence of civilization.

The religious ministrations to the Indian population is one of the most difficult problems of the Church. The Indian is extremely superstitious, and beneath his Christianity he preserves certain beliefs and observances of Incaic times. It is difficult to arouse in him any spiritual conception of religion. His persistence in the use of his ancestral tongue is another barrier to the efforts to inspire him with any real religious feeling.

CITIES AND TOWNS.

LA PAZ.

SITUATION AND PLAN.

La Paz, the actual seat of government and chief commercial city of Bolivia, is situated in the western part of the Republic and near the northern end of the great Bolivian table-land. It is about 30 miles southeast of Lake Titicaca, 279 miles from the Pacific coast at Arica, and 145 miles north of Oruro, the principal mining city of Bolivia. The city lies in a huge basin about 3 miles across and about 1,400 feet below the "alto" above, where the plain meets the main range of the Andes. The only natural outlet to this basin is on the south side, where the small River Choqueyapu, or La Paz, flows out through a rugged gap in the mountains on its way toward the Beni and the Amazon. The traveler reaches La Paz from the west, and as he approaches the city from Viacha across the barren pampa of the plateau he sees before him a vista of mountain scenery such as can be found in few places in the world. A number of mountain peaks stand out above the great mountain mass that seems to wall in the east. To the south is Illimani, one of the two highest of Bolivian peaks, which is plainly visible from La Paz; directly to the east is the truncated form of Mururata; and to the northeast is the sharp outline of Huayna Potosi. From the rim of the vast broken bowl in which the city lies, two railway lines wind down to the stations far below. The shortest road down into the city is by the Guaqui line's road from the Kenko to the Central Station, but the most interesting descent is by the Bolivia Railway's new extension to the Chijini Station. A much traveled road used by llamas and mules and passable for automobiles leads down into La Paz from the Kenko. Another road climbs out to the northeast by the Chuquia-guillo Valley and over the divide into the Yungas. The Yungas Railway follows this road over the pass, enabling people who leave La Paz in the morning to be down on the edge of the Tropics on the night of the same day. A third road follows the river down the canyon out of La Paz in the direction of Illimani. This road passes through the pleasant town of Obrajes, which is situated about 3 miles below La Paz and at an elevation about 1,000 feet lower. The two places are connected by a fair automobile road and by a street-car line. Some of the wealthier people of La Paz have homes in Obrajes, where the climate is superior to that of the city and the natural surroundings are more attractive.

There is little level ground in La Paz, and the streets generally conform their direction to the topography rather than to the strict checkerboard plan of most Spanish American cities. Their grades are often very steep, and some of the streets extend well up the wall of the "alto." Most of the streets are paved with rough cobblestones, though some are not paved at all. The thoroughfares best suited for motor traffic are the Prado and the Avenida Montes. The

Prado, otherwise known as the Avenida 16 de Octubre, is a wide avenue with a promenade space in the center and lined with eucalyptus trees. It connects the business part of the city with the residential quarter of Sopocachi and is itself bordered by attractive residences. One fork of the Prado forms the San Jorge and Obrajes road.

The Plaza Murillo is the center of the city's life. It is a small park set with trees and flower beds. Facing it are the National Palace, the Congress Building, the unfinished cathedral, and the leading hotel and club of La Paz. From the northwest corner of the plaza start Calles Comercio and Socabaya, two of the most important business streets of the city. Other business streets are Calle Diez de Medina, which is lined with dry-goods and clothing stores, and Calle Recreo. The latter extends from the Plaza Venezuela, at the end of the Prado, to the Plaza San Francisco, and contains a number of important grocery firms.

ARCHITECTURE AND BUILDING.

In La Paz, as in other Bolivian cities (though to a greater extent), several distinct types of architecture are noticeable. The most common type is the two-story, plain-front building which has been the prevailing style in most South American cities until recently. Though this class of building generally has two stories, it may have one or three. The interior rooms in these houses open onto a patio or interior courtyard, and the traditional Spanish "reja" or barred window and the balcony, often glassed in to serve as a sun parlor, still persist. The outside entrance is through a very heavy door with an old-fashioned lock. Houses of this kind are built up to the sidewalk and have no yard in the rear, the more protected patio serving in its stead. There are few remnants of colonial architecture, of which this type is an outgrowth, left in La Paz.

A different style of building has come into vogue in La Paz during the last two decades. The development of this new type is common to contemporary Latin America and is of French origin. These houses are much more ornate than the older buildings and many are of very attractive design and exterior, though a few of them are perhaps too extravagant and bizarre to be in good taste. The patio and "reja" tend to disappear, though the balcony is usually retained. An interior hall is substituted for the more spacious patio, but in some instances highly decorative iron grills are used in the lower windows. These houses seldom abut on the street, but a space is left in front, in which flowers and shrubs are planted. The builder's hardware used in the construction of this class of residences is of the most modern kind. The tendency is away from the severe simplicity of the old interiors to a greater effort at decoration. Walls and ceilings are papered, or tinted and stenciled with decorative figures. Increasing attention is paid to comfort as well as to appearance, and there is a growing tendency to install bathrooms, with modern fixtures, and up-to-date kitchens. The apartment-house type is also now beginning to appear in La Paz. Examples of the best residences of this type are the houses of Rafael Taborga and Benedicto Goitia.

Little effort is made to heat dwellings or offices in spite of the cold nights and mornings at this altitude. People dress more warmly indoors and grow accustomed to temperatures that persons used to steam heat would consider insufferable. Whatever heating is done

is by means of small electric heaters. Some use the old-fashioned brasier, and a few open fireplaces have been installed in the homes of Americans. The cost of both coal and wood is almost prohibitive for heating purposes. Kerosene heaters are little used.

Though plentiful, stone is little employed in building in La Paz, except in some public buildings. The better houses are built of brick, which is often faced with a coating of plaster or stucco. Much construction, especially of the more ordinary class of buildings, is done with adobe blocks about 12 by 6 by 2 inches in size. These crude bricks are often made by Indian workmen on the site of the building and are consequently very cheap. After the building is put up, a layer of muddy plaster is daubed over the outside. The better grade of bricks used are burned in kilns about the city, for which the peat found near the Yungas road makes excellent fuel. There are no wooden buildings in La Paz, and the use of wood in construction is reduced to a minimum, being largely limited to the framework of the better class of houses and to flooring and lathing. There is little hardwood flooring, though considerable pine lumber is used. Bricks and figured tiles are also used for floors. Though red tiles have been much used in the past for roofing, this class of roof is being supplanted by corrugated galvanized iron sheets ("calamina"), as a glance over the city will show. These sheets are also used for building warehouses and some kinds of temporary structures. Slate is used on a few buildings, and a locally made roofing material is being introduced. Though thatch is the favorite covering for the cheaper class of house, its use is forbidden by a city ordinance because of its inflammability. Though builders have begun to use concrete in certain classes of construction, iron reinforcing has not been introduced.

A better class of business buildings is being put up in La Paz. Among such structures are the Taborga Building on Calle Socabaya, the Saenz Building on Calle Comercio, and the W. R. Grace Building at the corner of Diez de Medina and Socabaya. The first is a modern office building of four stories, equipped with an Otis elevator. The Saenz Building is the home of the department store "El Louvre." The two-story Grace building is devoted exclusively to the operations of this company and is built in the same general style as the rest of its larger west-coast branches. The most pretentious of the bank buildings of La Paz is the home of the Banco Mercantil. The most prominent public buildings are the Palace and the Congress Building, the Tribunales de Justicia, or Court Building, and the new Aduana or Customhouse near the Challapampa Station. There are also a number of very attractive school buildings.

The most outstanding examples of church architecture in La Paz are San Francisco, noted for its ornate facade, begun in 1518; San Sebastian, begun in 1570; and Santo Domingo, which dates from 1590. A cathedral is under process of construction on the Plaza Murillo. There are several large convents in the city, including those of the Franciscan friars and of the Sisters of the Good Shepherd, or Buen Pastor.

WATER SUPPLY AND SEWAGE.

The northern section of La Paz derives its water supply from the vicinity of Milluni, which lies among the mountains in the direction of the peak of Huayna Potosi. At this point a mountain stream has

FIG. 6.—OFFICE BUILDING IN LA PAZ.

FIG. 7.—TYPE OF NEW BUILDINGS IN LA PAZ.

FIG. 8 —STREET IN SUCRE.

been dammed and a pipe led from the reservoir into the city. The Sopocachi district of the city is supplied from Tembladerani. The water supply is fairly free from organic contamination, though the source of supply is not strictly guarded against llamas and cattle. However, the water suffers from inorganic impurities consisting of certain salts washed down from the highly mineralized mountains down which the streams flow. Moreover, the quantity of water is not sufficient for the growing needs of the city.

The Ulen Contracting Corporation, of Chicago, has a contract pending with the Bolivian Government for the construction of a new waterworks system for La Paz. The conclusion of this contract largely depends on the reaching of an agreement by the two parties concerned as to the type of system to be used. The choice lies between sinking artesian wells above the city and drawing the water supply from the snow line of the near-by mountains. The former plan is estimated to cost about \$1,200,000 and the latter about \$2,000,000. However, it is highly doubtful whether sufficient water for the city's needs could be obtained from artesian wells, whereas tapping the edge of the snow beds would insure an ample supply of pure water for any contingency.

On March 17, 1920, a contract was signed between this same company and the Bolivian Government for the laying of a system of sewers for the city, to take the place of and supplement the present inadequate sewage facilities. The plans provide for the laying of about 57,450 meters (188,484 feet) of sewers, the cost of which will amount to about \$1,200,000. Two laws passed in January, 1920, provided certain special taxes for meeting the amortization and annual service on the bonds, which are to be issued to meet the expense of this work.

ELECTRIC LIGHT AND POWER.

Electric lighting in La Paz dates from 1888. Electric light and power is furnished by the Bolivian General Enterprise (Ltd.), a French concern, which is controlled by the great firm of Schneider-Creusot. Power is derived from the river, which flows through the city, the power house being located some distance above La Paz. Current is sold at 60 centavos per kilowatt for light and 30 centavos for heating purposes. Power is sold for industrial purposes at the rate of 30 centavos per kilowatt for the first 34 kilowatts taken, at 20 centavos for the following 50 kilowatts, and at 10 centavos for all quantities over 84 kilowatts.

STREET RAILWAYS.

The city street car system is operated by the same company that supplies La Paz with electricity. The city is well covered by the different lines of the company. One of these runs from the Chijini and Challapampa stations in the north end of town through the business district and thence by the Prado and Avenida Arce to San Jorge and Obrajés. Another line branches off from this route into the residential section of Sopocachi, and others lead to the Miraflores quarter or climb up through the northwestern part of the city to the cemetery. The trams used are small American cars. The second-class fare within the city limits is 10 centavos, and the first-class fare

is 20 centavos. In spite of complaints to the contrary, the service is fairly satisfactory.

TELEPHONES.

The La Paz telephone system is also owned by the Bolivian General Enterprise. The telephones used are largely of French make.

POLICE.

The preservation of order, which, in ordinary times, presents no serious problems, is in the hands of a body of men known as the "policia de seguridad." In addition to the regular municipal police force, there is a gendarmerie or body of mounted carbiniers, whose field of action also includes the country around the city.

FIRE PROTECTION.

As the construction materials employed in La Paz are noninflammable, fire risks give little concern to property owners or the municipal government. There is no public fire department, but, as is usual on the west coast, the business of fighting fires is left to local "cuerpos de bomberos," which are private organizations. None of these companies are equipped with modern apparatus, and there are, moreover, no high-pressure fire mains in the city.

A local insurance company, known as the Compañía Nacional de Seguros, began operations in 1918. The directors include some of the most prominent men in the country, among them being Jacob Backus, the general manager of the Bolivia Railway, and Carlos Calvo, the prominent lawyer and man of affairs. More than half of the stock is held by two foreign insurance companies, the Compañías Unidas de Seguros, of Lima, and the Compañía Internacional de Seguros, of Panama. The company is capitalized at 200,000 bolivianos. The reserve fund amounted at the end of 1919 to 57,007 bolivianos, and net profits in 1919 were 50,000 bolivianos. Premiums paid in 1919 amounted to 179,579 bolivianos.

MARKETS.

Though the public markets of La Paz are among the most picturesque in the world, they are neither modern nor sanitary. The central market is located in the heart of the city, where it occupies almost an entire block. Most of this space is covered, to protect the booths from the weather, and the interior of the place is dirty and gloomy. A large number of "cholas" keep stalls, where they sell everything from meat to curios—including cheap cotton and "bayeta" cloth, fruit and vegetables, blankets and ponchos, and cheap hardware and notions. A short distance away on Calle Recreo there is a fruit, vegetable, and flower market. On the Plaza San Francisco is another market, where scores of women sit in rows on the ground before small piles of vegetables or other goods that constitute their meager stock in trade. On one side of this square is a closed market. The most interesting market is the open-air fair held every Sunday in this plaza and extending most of the length of Calle Recreo and up several of the cross streets. Hundreds of Indians and "cholas" come into the city at the end of the week with burros laden with products of the surrounding valleys. On Sunday morning they take their places along the curb of the different streets which are set apart

by the municipal authorities for this purpose. From 8 o'clock until noon these streets form a scene of the greatest animation, and, with the highly colored shawls and ponchos of the natives, this probably constitutes the most colorful scene in South America.

BANKS.

All the general Bolivian banks have establishments in La Paz, including the home office of the Banco de la Nación Boliviana, the Banco Nacional de Bolivia, and the Banco Mercantil. There is also a branch of the Banco Aleman Transatlántico, and there are several large commercial houses which do a private banking business, including W. R. Grace & Co. and Denniston & Co. The mortgage bank, known as the Crédito Hipotecario, is located in La Paz.

HOTELS AND CLUBS.

The best hotel in La Paz, and the one almost exclusively patronized by foreign tourists and traveling men, is the Paris. This hotel is situated on the Plaza Murillo and contains about 50 rooms. Rates are about 12 bolivianos a day, American plan. The rooms are well furnished and quite comfortable and have running water connections. However, baths are separate. For an additional charge, electric heaters can be used in the rooms until 10 p. m. The food, though sufficient in quantity, shares in the general inferiority of the Bolivian cuisine. Another hotel is the Central, formerly the well-known Guibert. Mrs. Murray's large pension on the Prado furnishes good boarding-house accommodations at very reasonable rates to those who intend to make a long stay in the city.

There are no restaurants in the strict sense of the word, and such an institution is greatly needed to meet a real demand among foreigners and natives alike. A certain café-bar on the main plaza is much frequented by foreigners, and the Confitería Paris, a popular rendezvous at tea time and after the theater, is one of the best of its kind on the west coast.

The principal club of the city is the La Paz Club, which includes in its membership most of the prominent men of the town. The National Club largely drew its members from among the younger set of La Paz. An Anglo-American Club is now being organized to serve as a meeting place for the English-speaking community and out-of-town visitors from Great Britain and the United States.

THEATERS AND OTHER AMUSEMENTS.

The largest theater in La Paz is the Municipal, in which a season of light opera is held every year. The two other most important theaters are the Princesa and the Paris, which are devoted to vaudeville, motion pictures, and comedy. The capacity of both theaters is small, each one holding only a few hundred people. The motion-picture films exhibited are largely of American production, though they are often well aged before they reach La Paz. There are also picture theaters in the following cities: Cochabamba (2), Oruro (3), Potosi (1), Sucre (2), and Uyuni (1). The cold nights in La Paz prevent the fullest enjoyment of attendance at the theaters, which are unheated, even during the winter.

Among outdoor diversions in La Paz are golf and tennis. There is a golf club with links on the "alto" above the city, and there are several tennis courts. Among the natives considerable interest has been developed in association football. On July 4, 1920, the first baseball game in Bolivia was played in La Paz between two teams picked from the American colony. A full outfit was later presented to the soldiers of the local garrison in the hope that the natives would be aroused to take up the game. Those for whom bad roads have no terror may derive some pleasure from motoring about La Paz. There is one stretch of good road, a few miles long, from La Paz down the canyon through Obrajes, and motorists can drive as far as Lake Titicaca or Sorata during the dry season.

COST OF LIVING.

The increase in the cost of living between 1914 and 1920 is illustrated by the following scale of prices for some essential items:

Items.	1914	1920	Items.	1914	1920
	<i>Bolivi- anos.</i>	<i>Bolivi- anos.</i>		<i>Bolivi- anos.</i>	<i>Bolivi- anos.</i>
Two rooms and bath (furnished) . . .	80.00	175.00	Suitings yards	18.00	35.00
Small apartment (furnished)	100.00	225.00	Bread pound	.20	.30
Six to eight room house (unfur- nished)	160.00	200.00	Butter do	2.80	3.50
Eight to ten room house (unfur- nished)	200.00	300.00	Cheese do	2.00	3.00
Hard coal short tons	180.00	300.00	Eggs dozen	.80	1.80
Wood 100 pounds	2.50	3.80	Fish, preserved pound	.50	2.00
Shoes pair	20.00	35.00	Fruit, fresh do	.40	.50
Underwear suit	10.00	15.00	Meat, fresh do	.30	.70
Shirts each	6.00	12.00	Milk, unskimmed quart	.30	.60
			Potatoes pound	.10	.10
			Rice do	.20	.60

The following budgets (in U. S. currency) for a year's expenses, based on American standards of living, were prepared by the American consul in La Paz in 1920:

Items.	Single man.	Man, wife, and two chil- dren.	Items.	Single man.	Man, wife, and two chil- dren.
Rent hotel	\$1,300	\$1,800	Insurance	\$150	\$250
Food	500	2,000	Medical and dental attention . . .	150	300
Servants	300	400	Local transportation	150	250
Light	75	150	Social requirements	300	500
Heat	150	200	Recreation	350	500
Laundry	90	150			
Clothing	300	600	Total	3,815	7,400

COCHABAMBA.

The city of Cochabamba is situated on a plain that was formerly the bed of a lake, from which the Quechua name of the city is derived. It lies at a distance of about 4 miles from the range of the Cordillera Oriental to the north. The Rio Rocha, which for most of the year is but a small creek, flows through the city, dividing the main portion of the town from a pleasant suburb on the north side of the river. However, during the rainy season the stream assumes the proportions

of a river, so that the city has had to be protected by dikes from inundation. The altitude of Cochabamba is about 8,446 feet above the sea.

Because of Cochabamba's relatively low altitude, its climate is very pleasant throughout the year, as there are no extremes of either heat or cold. The summer, or time of highest temperatures, which includes the months from November to March, is also the rainy season. The season of lowest temperatures extends from June through August, and is also the dry season.

The water supply for the city comes from lagoons located at Arocagua, a few miles from the city limits. Not only is the quantity insufficient, but the quality is poor. A contract is now under consideration for the construction of a new waterworks system by the Ulen Contracting Corporation, which has recently obtained a contract for constructing a sewage system for the city. At present many of the streets of the city serve as open sewers, to the detriment not only of the appearance of the place but also of the health of the inhabitants. The cost of the new system of sewers, the contract for which was signed on March 17, 1920, will be about \$1,000,000. About 49,470 meters of pipe will be laid.

Cochabamba, which is the second city in Bolivia, has a population of about 35,000 people. It is the only city in Bolivia that has a considerable number of large tributary towns within a short radius around the city. Three wide valleys radiate in different directions from Cochabamba—that of Quillacollo to the west, Sacaba to the northeast, and the rich valley of Punata, which is followed to its termination at Arani by a narrow-gauge railway. There are several towns in these valleys with populations from 1,000 to 8,000, including Tarata and Cliza, in addition to the four towns named above. However, the backward appearance of most of these towns does not accord with the natural wealth of the surrounding country. In spite of the impulse given to its development by the opening of the railway from Oruro, there has been little change in the aspect of Cochabamba itself, and most of the buildings are old. However, some modern construction is now under way. The life of the city revolves about the central plaza, which is surrounded by long colonnaded buildings, including the offices of the prefecture and the municipality.

Electric light and power is furnished the city by the Empresa Luz y Fuerza Eléctrica, which also operates the railway lines to Vinto and Arani. The same company owns the local tramway system. The income from the sale of electric current during 1919 amounted to 110,122 bolivianos, and from the tramway service to 59,119 bolivianos. The cost of electricity in Cochabamba is less than in any other city in Bolivia. The net profits from these and other minor interests of the company amounted to 96,344 bolivianos in 1919. Telephone service is supplied by a local concern, known as the Empresa de Teléfonos, Sucesores de N. Peña.

The large public market is among the most insanitary in Bolivia. Between 800 and 1,000 women conduct stalls in the market. No effort is made to protect meat or vegetables from contamination, and the municipality declares that its finances are inadequate for the construction of a new and sanitary market.

The banks maintaining branches in Cochabamba are the Banco de la Nación, the Banco Nacional, and the Banco Mercantil. The last-named bank has a new building in course of construction.

The best hotel in Cochabamba is the Majestic. Both rooms and food are very good. The rate is 10 bolivianos a day, American plan. Other hotels are the Unión and the Hispano-Americano.

ORURO.

The city of Oruro is situated at the foot of a series of low mountains about 2,000 feet high. From the opposite side of the city a level plain stretches away to another range of mountains about 5 miles distant. The altitude of the city is about 12,122 feet above sea level. The population of Oruro is variously estimated at 25,000 to 30,000, thus making it probably the third city of Bolivia in size.

The appearance of the city partakes largely of the desolate character of its surroundings, though much has been done during the past few years to improve it. Streets have been paved (though with rough cobblestone), some good sidewalks have been put in, the two principal plazas have been improved and hardy trees have been planted in them, and some very creditable buildings have been constructed. Among the latter are the new post office, the Patiño Building, the new home of the Banco de la Nación, and an attractive motion-picture theater. The city suffers from the lack of adequate sewage facilities, the streets being used for that purpose in some parts of the town, but a contract is now under consideration, with the same American company that holds similar contracts in La Paz and Cochabamba, for the installation of a modern sewage system at a cost of \$1,000,000.

Oruro is supplied with water from a stream on the opposite side of the valley at a place known as Calacala. Though this water supply is of very fair quality, the quantity is insufficient for the industrial needs of the city. Electric light is furnished by the Empresa de Luz y Fuerza Eléctrica de Oruro, which is controlled by the German hardware firm of Gustavo Hinke & Co. One of the mining companies operating in the hills on the edge of the city also sells electric current to the public. The local telephone service is owned by a concern known as the Empresa de Teléfonos N. Peña.

The principal office of the Banco Mercantil, of Simon Patiño, is located at Oruro. Other banks maintaining branches at Oruro are the Banco de la Nación, the Banco Nacional, and the Banco Aleman Transatlántico.

The Eden Hotel offers fairly good service at 10 bolivianos a day. Other hotels are the Unión, the Quintanal, and the Alemán.

SUCRE.

The city of Sucre is situated in a pocket in the mountains of Chuquisaca, at an altitude of about 9,338 feet above the sea, thus possessing a climate that is exceptionally mild and pleasant throughout the year. The annual rainfall amounts to 30 to 36 inches, nearly all of which takes place between December and April.

The population of Sucre is between 20,000 and 24,000. A number of wealthy families, whose fortunes were made in mining and bank-

ing, live here, the founders having come to Sucre from other parts of the country because of the superior climatic and other conditions which characterize the place. They constitute a cultured and refined aristocracy, most of whose members have traveled beyond the confines of Bolivia and have brought back from abroad certain cosmopolitan tastes and ways. Both men and women are the best-dressed people of their social rank in all Bolivia. The rest of the population is largely composed of the usual proportion of cholos and Indians found in a Bolivian city. Quechua is the customary language of intercourse of the lower classes.

Sucre is the capital of the department of Chuquisaca, authority being exercised by a prefect, appointed from La Paz. Formerly this city was the capital of the Republic, but since 1900 La Paz has been the de facto capital. However, the Sucrenses still consider their city the legitimate capital and refer to La Paz as the "seat of government." The removal of the capital to La Paz has naturally had a depressing effect on the business situation of Sucre. A pretentious but unfinished capitol building still stands as a monument to the aspirations of its inhabitants. The city has remained the seat of the Supreme Court and of the archbishopric.

A sufficient supply of good water is furnished the city from the locality of Cajamarca, a few miles from Sucre. Electric light and power is supplied by the Empresa de Luz y Fuerza Eléctrica de Sucre, and the present plant of this company, which has paid dividends of 12 per cent to its shareholders, has a capacity of 115 horsepower. A new company was organized in 1920 as its successor, known as the Sociedad Industrial de Electricidad, and the plant, which is to have a capacity of 400 horsepower, is to be located at Tuma on the Río Cachimayo, about 6 miles outside of Sucre. The nominal capital amounts to 1,000,000 bolivianos, of which 875,000 bolivianos had been paid up in July, 1920. The equipment ordered for the new plant is of American manufacture. The public telephone service of Sucre is operated by a local company.

The central bank of the Banco Nacional de Bolivia, with which the Banco Francisco Argandoña was recently amalgamated, is located in Sucre. There are also branches of the Banco de la Nación, the Banco Mercantil, and the Banco Hipotecario.

The principal hotel is the Colon, which gives fair service for the small sum of 6 bolivianos a day, American plan. The Hispano-Americano is another hotel. The Club de la Unión is one of the best-appointed clubs in Bolivia.

POTOSI.

The historic city of Potosi, known in colonial times as "the Imperial City," is located in a pocket in the mountains at the foot of the famous Cerro, whose mineral wealth led to the foundation of the city. Potosi is the highest city in Bolivia, being situated at an altitude of 13,612 feet above the sea, while the Cerro rises about 2,000 feet higher. The city was founded by the Spaniards in about 1545, and during the height of the mining boom had a population of more than 160,000 people. The city now numbers between 27,000 and 30,000 inhabitants, of whom the large majority are Indians and "cholos."

The city has preserved much of the aspect of colonial times. It has some notable churches and the famous Casa de Moneda, or mint, is

still standing. Most of the houses are built of brick coated with plaster, though the poorer houses are constructed of adobe, with a thin layer of plaster on the outside. Barred windows and balconies and interior courtyards, often of great antiquity, are common features of architecture. The streets are narrow and crooked and paved with cobblestones. Sanitary conditions are bad, though favored to some extent by the good natural drainage of the site. The water supply comes from a system of 21 old lagoons constructed by the Spaniards above the city, with a total capacity of 5,672,500 cubic meters of water. The capacity of these reservoirs is to be increased shortly, upon the carrying out of plans for a system of sanitary works in Potosi, as in other Bolivian cities. Light and power are supplied to the city by the Empresa Luz y Fuerza Eléctrica, controlled by Rodríguez & Cía. The hydroelectric plant is located about 6 miles from the city, where a stream has been dammed to form a small lake.

Three banks serve the city—branches of the Banco de la Nación Boliviana, the Banco Nacional de Bolivia, and the Banco Mercantil.

The two principal hotels are the Splendid and the Paris, rates being only 5 bolivianos a day, with service and accommodations in accordance.

SANTA CRUZ.

The city of Santa Cruz, which was founded in 1560, is situated in the heart of eastern Bolivia, about 350 miles east of the railhead at Cochabamba and about 450 miles from the Paraguay River to the east. It lies about 3 kilometers (nearly 2 miles) from the Rio Pirai, at an altitude of about 1,380 feet above sea level. It is located in the midst of a great plain across which a network of roads leads in every direction. Most of the construction is of plaster and wood, and the houses generally have porticoes in front for protection against the heat. The streets are unpaved and are deep in sand when they are not flooded by the torrential rains that fall during the summer. Kerosene lanterns are used for lighting. The water supply is obtained from about 10 semiartesian wells.

The Banco de la Nación Boliviana has a branch in Santa Cruz. The best hotel is the Comercio, which is situated on the main plaza and near the prefecture. In 1900 Santa Cruz had a population of 18,335 and at present probably has 20,000. An unusually large proportion of the people are of the white race, and the Cruceños are noted throughout Bolivia for their hospitality and courtesy to strangers. Once the resources of the surrounding region can be developed, Santa Cruz is undoubtedly destined to be one of the foremost inland cities in all South America.

TARIJA.

Tarija, which was founded in 1574, is situated in a plain among the mountains of southern Bolivia. It lies about 85 miles east of Tupiza on the road from La Paz by Uyuni into Argentina and about 45 miles north of the Argentine frontier. The city is located at an altitude of about 6,500 feet above sea level, and is built on the banks of the Rio Grande de Tarija, a branch of the Bermejo.

The population of Tarija is between 9,000 and 10,000. There are branches of the Banco de la Nación, the Banco Nacional, and the Banco Mercantil.

UYUNI.

The important trading and railway center of Uyuni is situated near the southern end of the great Bolivian Plateau, at an altitude of about 11,972 feet above the sea. It lies almost midway between Antofagasta and La Paz, being at a distance of 617 kilometers (383 miles) from the former and 556 kilometers (345 miles) from La Paz. It is the seat of the subprefecture of the Province of Porco in the Department of Potosí. The surrounding country is an almost complete desert, the only vegetation being a scant scrub growth. There is no vegetation whatever in the town of Uyuni, and the appearance of the place, which consists of rows of one-story houses, bordering very wide, sandy streets, is desolate and unattractive in the extreme. Uyuni has the most rigorous climate in Bolivia, and one who has experienced the Siberian cold of a winter night in this town can never forget the experience.

The population of the town is between 3,000 and 3,500, probably less than that of the near-by mining camp of Huanchaca-Pulacayo. About 10 per cent of the population is white, and the remainder are "cholos," comprising all degrees of mixture of Indian and white.

There are branches of both the Banco de la Nación and the Banco Nacional. The best hotel in the town is the Uyuni, which is situated near the railway station. Rates are very moderate—6 bolivianos a day—and the service is fairly satisfactory, though the guest may sometimes have to dine muffled to his ears in an overcoat.

OTHER TOWNS.

Large towns have grown up about some of the chief mining centers, such as Uncia, Llallagua, Corocoro, Pulacayo, and Colquechaca. Some of these have several thousand inhabitants. Others, like Viacha and Guaqui, have developed at railway junction points. Some of the large Indian towns of the "altiplano," such as Sicasica and Charana, are places of utter dreariness. The Yungas towns are small and backward in appearance, but picturesquely situated and enjoy a fine climate. They are usually built high up on the mountain sides or in some cases on the very crest of the mountains. There are few accommodations for travelers, as is the case in nearly all the small towns of Bolivia. The most important towns of the Yungas are Chulumani, with about 2,500 inhabitants; Coroico, 1,800; Coripata, 800; and Irupana, 700. Other towns are Yanacachi, Villa Aspiazu, Chirca, and Pacallo. These are pleasant villages, set high up on the mountain sides, among orange groves and coca fields, and inhabited by a hospitable and kindly people.

The most important towns in the Amazonian region of Bolivia are as follows:

Riberalta.—This town is situated on a prominence, about 30 meters above the ordinary level of the rivers, at the confluence of the Madre de Dios and the Beni. It is the most important trading center of the Beni and has a population of between 3,500 and 4,000 people. It is a comparatively new town, having been founded in the eighties of the last century. The town has a branch of the Banco de la Nación and an important wireless station.

Villa Bella.—Villa Bella is situated at the confluence of the Beni and the Mamore, but is cut off from the upper course of these rivers

by rapids or "cachuelas." It lies about 125 miles from Riberalta. The population of the town is between 1,500 and 2,000.

Trinidad.—This town is the capital of the Department of El Beni and has a population of about 4,000 people. The place was founded in 1562 and was formerly of much more importance than at present. It lies about 6 miles from the Mamore, but it is proposed to dig a channel from the river to the town that will be navigable for launches. The town consists of rows of wooden houses running at right angles to each other and straggling over the grassy prairie, which is subject to inundation during the rainy season. The houses are mostly built of insufficiently seasoned lumber, which quickly decays under the action of the climate—an old Jesuit church being the only building of durable material.

Cobija.—This town, the capital of the Territory of Colonias, is located on the Rio Acre and opposite Brazilian territory. It has rapidly increased in importance because of its position in the rubber trade and now has a population of about 3,000.

Magdalena.—Magdalena is located on the Rio Itonama in the Province of Itenez, Department of El Beni. Its population is about 2,000.

Baures.—This town is situated on a river of the same name in the Province of Itenez. Its population is between 1,500 and 2,000.

Among other Bolivian towns are the following: Mizque and Aiquile, lying in isolated valleys on the road between Sucre and Cochabamba; Totorá, situated among the mountains on the way from Cochabamba to Santa Cruz; Padilla and Lagunillas, to the southeast of Sucre, Lagunillas being the center of petroleum operations in eastern Bolivia; Cotagaita, to the south of Potosi; Camargo, lying in a pleasant valley north of Tarija; Sorata, situated under the shadow of Illampu to the east of Lake Titicaca; and Tupiza, which lies about midway between the Bolivian and Argentine railheads on the road from Uyuni to La Quiaca. Tupiza is a place of about 1,500 people, situated in a well-cultivated valley at an altitude of about 9,800 feet. Though its present commercial importance is very limited, the completion of the railway between Atocha and the Argentine border should give a considerable impulse to its growth. It has branches of the Banco de la Nación and of the Banco Nacional de Bolivia.

TRANSPORTATION AND COMMUNICATIONS.

EXTERNAL TRADE ROUTES.

Because of the inland position of the country the question of foreign outlets is of the most vital importance to Bolivia. At present all its foreign commerce passes through the territory of other countries. Its outlets to the Atlantic are by way of Brazil or Argentina, and those to the Pacific by way of Peru or Chile. Though the passage of merchandise to and from Bolivia through these countries is subject in normal times to few restrictions, national pride and the fact that the freedom of this transit trade depends, at last resort, upon the will of other powers have made this question of outlets the very basis of Bolivia's foreign policy. Free transit of goods across Argentine territory is guaranteed by a treaty of 1868. Transit trade across Brazil is carried on under the provisions of the treaty of 1903, with further regulations provided by a treaty of 1910. The treaty of 1904 established the right of free transit across Chilean territory, and a convention drawn up in 1912 contains regulations for the enforcement of these articles of the original treaty. Trade by Mollendo, in Peru, is regulated in accordance with a treaty of 1905 and two supplementary agreements of 1917. However, the Bolivians contend that these treaties do not offer the necessary guaranties or freedom from the intervention of foreign customs officials in transit shipments to and from Bolivia. They also claim that they do not assure adequate protection against smuggling operations organized on the territory of these neighboring countries. Also, the circumstance that all Bolivian commerce has the character of transit trade makes it difficult to center responsibility for the loss of freight in transit. Thus, in Bolivia it is customary to put the blame for all pilferage on those who move the goods at the coast ports, where Bolivia has no control over lightermen and stevedores.

There are three distinct connections with the Pacific coast. The most northerly of these is that formed by the Guaqui-La Paz Railway, the line of steamers on Lake Titicaca, and the Southern Railway of Peru, terminating at Mollendo. This Peruvian port shares in the general bad character of west coast harbors and is only an open roadstead exposed to the long, heavy swell of the Pacific and the storms of the winter season. Freight is transferred between ship and shore by means of lighters, and at times the loading and landing of goods is impossible. Mollendo itself is an unattractive town of about 2,000 people, situated on a bench of land about 75 feet above the ocean, at the edge of the desert which extends inland in an unbroken waste to the beautiful oasis of Arequipa. The distance from Mollendo to La Paz is about 529 miles.

The two other outlets to the Pacific are through Chile, terminating at Arica and Antofagasta. Arica is the Pacific port nearest to La Paz, the distance between the two places being only 279 miles. Communications are had over the Arica-La Paz Railway (Ferro-

carril de Arica a La Paz). Arica is a place of about 4,000 people, and is also connected by a local railway line with Tacna, which lies 39 miles to the north. The port of Arica is protected by an island lying to the south and by a reef which connects this island with the mainland. This gives shipping considerably greater security than vessels enjoy at either Mollendo or Antofagasta. However, transshipping operations are carried on by means of lighters, as at the other ports. There are wooden piers, to which goods are raised from the lighters by steam cranes and on which railway tracks are laid.

The third outlet is through Antofagasta. This port is connected with La Paz and other cities of the plateau by the lines of the Antofagasta & Bolivia Railway and the Bolivia Railway. The junction of these two roads, both of which are under the same management, is at Uyuni, in Bolivia. The distance between La Paz and Antofagasta is 727 miles. The harbor of Antofagasta, like that of Mollendo, is an open roadstead, though important harbor improvements are projected. The transfer of freight is handled in the same manner and attended with the same difficulties. Antofagasta is a comparatively well-built city of between 30,000 and 40,000 people and is a very important shipping point, not only for the mineral products of southern Bolivia, but for the copper, nitrate, and borax produced within the Province of Antofagasta.

The Bolivian consuls at these ports act as "agentes aduaneros," or representatives of the Bolivian customs service. In this capacity they are empowered to register consignments of merchandise in transit to and from Bolivian points and to protect the rights of Bolivian shippers and consignees.

Bolivia has connections with the Atlantic coast through both the Amazon and the Plate. The former river is the outlet for the rubber of the Beni and Colonias regions. Most of this export of rubber is sent out over the Madeira-Mamore Railway and down the Madeira River, to be reembarked at Manaos or directly from Para for Europe and the United States. The total distance from Riberalta, the commercial center of the rubber country, to Para is about 2,300 miles.

There are three different routes connecting Bolivia with the River Plate. One of these consists of the mule-and-cart road between Santa Cruz and Puerto Suarez and the lines of steamers that connect Puerto Suarez through Corumba with Buenos Aires and Montevideo by way of the Paraguay, Parana, and Plate. The distance from Buenos Aires to Puerto Suarez is about 1,730 miles and thence to Santa Cruz, 490 miles farther. There are two all-land routes from Bolivia across Argentine territory, terminating at the River Plate. One of them is formed by the road that leads south from Santa Cruz to the border at Yacuiba, and thence to the railroad at Embarcacion, on the Bermejo. From this point there are rail connections to Buenos Aires, the route being by the Argentine Central Northern Railway as far as Tucuman, which is the northern terminus of both the Central Argentine and the Central Cordoba. The distance from Yacuiba to Buenos Aires is about 1,214 miles and the total distance between Santa Cruz and the River Plate by this route is about 1,590 miles. The alternative route is that which connects the Bolivian plateau with the Argentine seaboard, as the other route furnishes

an outlet for the plains region of eastern Bolivia. The successive stages in this route consist of the Bolivia Railway Co.'s line from La Paz to the temporary railhead at Atocha, the 125 miles of mule- and-automobile road that fills the gap between Atocha and La Quiaca, and the railway from the frontier at La Quiaca to Buenos Aires. From Perico, in the Province of Jujuy, into Buenos Aires this route is identical with that from Yacuiba and Embarcacion.

The proportion between exports from Bolivia by the various outlets in 1918 was as follows:

Outlets.	Weight.		Value.	
	Metric tons.	Percent- age.	Bolivianos.	Percent- age.
Pacific.....	102,641,569	85.03	164,871,449	90.28
Chile.....	97,719,024	80.95	155,599,418	85.21
Arica.....	46,340,558		65,797,316	
Antofagasta.....	32,276,357		46,294,681	
Mejillones.....	5,107,346		38,197,527	
Ollagne.....	3,935,292		5,296,058	
Caquena.....	59,470		13,532	
Peru.....	4,922,545	4.08	9,272,331	5.07
Mollendo.....	3,513,242		8,959,578	
Puno.....	1,381,618		290,410	
Cojata.....	20,464		9,205	
Tambopata.....	7,221		13,108	
Atlantic.....	18,069,091	11.97	17,741,402	9.72
Argentina.....	12,415,689	10.29	6,591,576	3.61
La Quiaca.....	6,406,081		5,202,430	
Pocitos.....	5,301,620		1,216,611	
Bolivian.....	472,000		106,200	
Tartagal.....	157,220		36,671	
Itaperenda.....	41,600		9,300	
Yavi.....	27,015		4,091	
Calahoyo.....	6,870		13,740	
Embarcacion.....	3,280		2,474	
Brazil.....	5,653,405	4.68	11,142,826	6.11
Porto Velho.....	1,845,616		3,750,636	
Para.....	1,612,983		3,879,658	
Puerto Acre.....	1,231,552		3,000,069	
Corumba.....	913,344		519,522	

In 1915 the proportion of Bolivian exports sent out in transit through these four countries was as follows:

Countries.	Weight.		Value.	
	Metric tons.	Percent- age.	Bolivianos.	Percent- age.
Chile.....	77,601,759	83.91	77,755,137	81.67
Argentina.....	7,286,135	7.88	3,890,836	4.09
Brazil.....	5,134,203	5.66	10,253,461	10.77
Peru.....	2,364,906	2.55	3,310,916	3.47

Total imports through the four countries in 1918 were as follows:

Countries.	Weight.		Value.	
	Metric tons.	Percent- age.	Bolivianos.	Percent- age.
Chile.....	106,659,611	70.93	18,078,453	51.65
Peru.....	32,083,721	21.35	11,460,325	32.55
Argentina.....	8,378,776	5.56	4,067,574	11.74
Brazil.....	3,231,620	2.16	1,393,535	3.86

Imports in 1918 through the three Pacific ports, which comprise the total importations through Chile and Peru, were as follows:

Ports and classes of goods.	Metric tons.
Antofagasta:	
Chilean goods and "nationalized" or reexported foreign goods.	42,576,561
Foreign goods in transit to Bolivia.	23,866,279
Arica:	
Chilean goods and "nationalized" or reexported foreign goods.	24,160,021
Foreign goods in transit to Bolivia.	16,036,751
Mollendo:	
Peruvian goods and "nationalized" or reexported foreign goods.	12,788,705
Foreign goods in transit to Bolivia.	19,297,016

The volume of exports through the same ports for the years 1915-1918 was as follows:

Years.	Arica.	Antofagasta.	Mollendo.	Other routes.
	<i>Metric tons.</i>	<i>Metric tons.</i>	<i>Metric tons.</i>	<i>Metric tons.</i>
1915.	32,021,062	45,583,696	2,364,906	12,529,339
1916.	42,665,585	53,720,230	2,835,207	19,164,592
1917.	43,563,696	47,145,974	4,663,321	56,424,404
1918.	46,340,558	32,276,357	3,513,242	38,580,507

Whereas in 1915 only 34 per cent of the total exports of Bolivia went through Arica and 49 per cent, or nearly half, through Antofagasta, in 1918 Arica had 38.39 per cent and Antofagasta 26.74 per cent of the exports. However, exports through Mejillones, which lies a short distance to the north of Antofagasta, increased enormously during this period, particularly after 1916, as is shown above by the figures for "Other routes."

The distances between important points of shipment in Bolivia and the three ports of Antofagasta, Arica, and Mollendo are as follows:

La Paz to	Miles.	Cochabamba to	Miles.
Arica.	279	Arica.	511
Antofagasta.	719	Antofagasta.	706
Mollendo.	535	Mollendo.	772
Oruro to—		Machacamarca to	
Arica.	384	Arica.	398
Antofagasta.	637	Antofagasta.	560
Mollendo.	611	Mollendo.	656

RAILWAYS.

HISTORICAL SURVEY.

The first railway in Bolivia was the line built from Antofagasta to Uyuni to serve as an outlet for the mines of Huanchaca. This line was opened to traffic in 1889, and the next year was sold to the Antofagasta & Bolivia Railway Co. However, the greatest impulse to railway building was given during the administration of President Ismael Montes (1901-1909). By the end of 1913 there were three lines between the Bolivian plateau and the coast. The line from

Antofagasta to Uyuni was extended north to Oruro in 1892, giving a new impetus to the development of the mining industry to the east of the railway. In 1913 this line, known as the Bolivia Railway, reached Viacha, with connections into La Paz. The same year the long-promised Chilean line from Arica to La Paz was also completed.

In 1903 the railway from Lake Titicaca reached the "alto" of La Paz and gave that city connections with the coast at Mollendo over the Southern Railway of Peru. Two years later the section known as the "bajada" was built from El Kenko, at the edge of the "alto," down into La Paz.

The main trunk lines were later supplemented by branches built into important industrial centers. In 1912 a branch of the Bolivia Railway was extended from Rio Mulatos into Potosi, and five years later Cochabamba was linked up with the main line at Oruro. In 1913 the line which was to connect the Bolivian and Argentine systems reached Atocha from Uyuni, and in 1914 a spur of the Arica-La Paz Railway was built in to the copper mining town of Corocoro by the Bolivian Government. Work was first begun on the Yungas Railway in 1915, and the first section to the divide was opened to traffic five years later. Two short private lines, operated by mining interests, have been built. One of these connects Uyuni with the mines of Huanchaca-Pulacayo, a distance of 24 miles, and the other, which leaves the Bolivia Railway at Machacamarca and was intended to serve the rich tin-mining district of Uncia, is nearing completion. Before the opening of the branch from Oruro to Cochabamba two narrow-gauge lines had been built out of Cochabamba to near-by towns by the Empresa Luz y Fuerza Eléctrica de Cochabamba.

PROBLEMS OF RAILWAY CONSTRUCTION.

The topography of the country presents very serious obstacles to railway building in Bolivia. Not only was it necessary to overcome a difference in altitude amounting to about 14,000 feet in order to reach the plateau from the coast, but the mountainous character of most of the "altiplano" makes railway construction in that region difficult and expensive. The Guaqui-La Paz Railway and the main line of the Bolivia Railway are exceptions, since for most of their length their tracks were laid across the "meseta" or table-land, which extends with few breaks from below Uyuni north to Lake Titicaca. The Yungas Railway, the Potosi and Cochabamba branches of the Bolivia Railway, and the line now building from Potosi into Sucre illustrate the problems faced by engineers in routing and building railways in Bolivia.

Climate is another material factor that influences the construction of railways, particularly in the "montaña" region to the east of the Cordillera Real. The excessive rains that fall in this zone of semi-tropical valleys may not only force the suspension of work for weeks at a time, but make the problems of roadbed construction particularly difficult. Washouts and slides are very frequent in this mountainous country, and since railway routes follow the narrow valleys of rivers for most of their way, the protection of the track against floods often demands the construction of elaborate defensive works, as on the Cochabamba line.

The supply of labor for large enterprises is small in Bolivia, especially as the mines take increasing numbers of men. It is usually difficult to secure enough laborers for railway construction and as difficult to hold them after they are engaged. The importation of foreign labor for this class of work is of very doubtful advisability, as only the Bolivian or Peruvian Indian or "cholo" is by nature adapted to hard manual labor at this altitude.

The railway legislation of Bolivia has been collected in a book entitled "Legislación Ferroviaria." Railway construction is largely governed by the general law of October 3, 1910. Meter gauge (meter = 3.28 feet) is prescribed for all lines built within the country. Concessions are usually granted for a term of 99 years, after which the lines revert to the State. The Government may expropriate a line at any time on payment of the actual valuation plus 25 per cent. A "privilege" zone of 50 kilometers (31 miles) is granted on either side of the right of way, in which no competing line may be built. Other privileges granted are the right to expropriate land under a law of eminent domain, the right to use public land and any timber or stone that may be on it, exemption from taxation for a specified time and from payment of import duties on materials used, and exemption from military service for employees unless in case of a war with a foreign power. Guaranties of interest on investment are generally fixed by the Government at a maximum of 5 per cent on the capital, advances to be reimbursed to the Government out of net earnings in excess of 5 per cent. The railway company may relinquish its right to the guaranty at any time upon reimbursement of the total advances made to it by the Government. Land in alternate lots along the right of way may be granted to the constructing company in lieu of a money guaranty, when such land is available.

LIST OF RAILWAYS.

The mileage of railways constructed, under construction, and projected at the beginning of 1920 was as follows:

	BUILT.	
	Kilometers.	Miles.
Antofagasta & Bolivia Railway Co.:		
Bolivian section of main line.....	486	302
Viacha-La Paz.....	29	18
El Kenko branch.....	8	5
Bolivia Railway Co.:		
Viacha-Oruro.....	202	126
Rio Mulato-Potosí.....	174	108
Oruro-Cochabamba.....	205	127
Yuni-Atocha.....	90	56
Cía. Huanchaca de Bolivia, Yuni-Pulacayo.....	38	24
Empresa Luz y Fuerza Eléctrica Cochabamba:		
Cochabamba-Vinto.....	18	11
Cochabamba-Arani.....	60	37
Ferrocarril de Arica a La Paz: Arica-Alto La Paz (Bolivian section)...	233	145
Peruvian Corporation Ltd.: Guayaqui-La Paz.....	98	61
Simón I. Patiño: Machacamarca-Uncia.....	60	37
Corocoro branch of Arica-La Paz Railway (property of Bolivian Government): Tareja-Corocoro.....	8	5
Ferrocarril Potosí-Sucre (property of Bolivian Government).....	50	31
Ferrocarril Yungas (property of Bolivian Government).....	26	16
Total built.....	1,785	1,109

UNDER CONSTRUCTION OR PROJECTED.

Simon I. Patiño: Unconstructed section of Machacamarea-Uncia line.....	Kilometers.	Miles.
.....	44	27
State lines:		
La Quiaca-Tupiza.....	100	62
Potosi-Sucre.....	128	80
La Paz-Yungas (estimated).....	100	62
Atocha-Tupiza.....	104	65
Total under construction or projected.....	476	296
Total of all lines.....	2,261	1,405

LINES OF ANTOFAGASTA & BOLIVIA RAILWAY CO.

The most important system in Bolivia is that of the Bolivia Railway Co., now under the control of the Antofagasta & Bolivia Railway Co. The lines of the Bolivia Railway Co. were leased in 1908 by the Antofagasta & Bolivia Co., so they are now operated as a single system. For administrative purposes the combined lines are divided into a Bolivian and a Chilean section. The offices of the Bolivian section are in La Paz and of the Chilean section at Antofagasta. The home offices of the Antofagasta & Bolivia Co. are located at 1 Broad Street Place, Finbury Circus, E. C. 2, London. The offices of the Bolivia Railway Co. are in New York. The traffic department of the Bolivian section is located at Oruro.

The Bolivia Railway Co. was organized as a result of the national law of November 27, 1906, which represented the policy of the Montes administration of linking up the plateau cities by means of railways. At that time the Bolivian Government had at its disposal \$9,720,000, which had been paid by Brazil in accordance with the provisions of the treaty of Petropolis. The Government also had at its disposal additional funds, which made a very considerable total for the building of railways, for which President Montes destined these resources. In May, 1906, a contract was signed with the New York banking house of Speyer & Co. and the National City Bank of New York, providing for the construction and operation of a line of railways on the plateau. The two banking houses were to promote the establishment of a separate company, which was to have charge of the work and its subsequent management in trust. The company organized for this purpose was the Bolivia Railway Co., which was chartered in New York.

According to the contract made between the Bolivian Government and the Bolivia Railway Co., the cost of the lines projected was calculated at the net figure of \$26,730,000 United States gold, to cover which the two following issues of bonds were made:

(a) First mortgage bonds, \$18,225,000, which the lessees bound themselves to take at 5 per cent interest, which was guaranteed by the Bolivian Republic for 25 years. These bonds were issued at the rate of 80 per cent, yielding a net sum of \$14,580,000.

(b) Second mortgage bonds, \$12,150,000, which the Bolivian Government took at par, with interest up to 5 per cent allowable with the net rental of the lines after payment of the service on the first mortgage bonds, and redeemable within 25 years.

The contract held by the Bolivia Railway Co. involved the expenditure of about \$31,000,000, or about \$4,000,000 more than the original

estimated cost. This amount the lessees invested on their own account and without fiscal guaranty, in accordance with one of the provisions of the contract.

The lines constructed by the company have a total mileage of 416, divided as follows, with the cost of each section:

Oruro-Viacha, 125 miles.....	£1,063,608	(\$5,176,048)
Oruro-Cochabamba, 127 miles.....	2,747,721	(13,371,784)
Rio Mulato-Potosi, 108 miles.....	1,518,716	(7,390,831)
Uyuni-Atocha, 56 miles.....	532,154	(2,589,727)
Total, 416 miles.....	5,862,199	(28,528,391)

In 1908 the Bolivia Railway Co. leased its rights under the contract with the Bolivian Government to the Antofagasta & Bolivia Railway Co. for a term of 99 years, to date from January 1, 1909.

To the end of 1918 the total cost of the Bolivia Railway Co.'s lines and expenditures for studies and materials were as follows (conversions have been made at the rate of \$4.8665 to the pound sterling):

Viacha-Oruro line.....	£1,063,609	(\$5,176,053)
Oruro-Cochabamba line.....	3,257,219	(15,851,256)
Rio Mulato-Potosi line.....	1,540,378	(7,496,250)
Uyuni-Atocha line.....	532,230	(2,590,097)
Studies for La Paz-Puerto Pando line.....	9,488	(46,173)
Studies for Potosi-Sucre line.....	193	(939)
Materials on hand and in transit, deduction of £720 being made for difference between capital and property accounts.....	270,115	(1,314,516)
Total.....	6,673,232	(32,475,284)

The issue of first and second mortgage bonds in accordance with clause 6 of the original contract amounted to £5,500,000 (\$26,765,750), leaving a difference of £1,173,232 (\$5,709,534).

The annual service of £187,500 (\$912,469) for interest on the total issue of guaranteed first-mortgage bonds—£3,750,000 (\$18,249,375) at 5 per cent—was met in 1918 from the following resources:

30 per cent of the gross revenues of the Viacha-Oruro line, after deducting the quota assigned for supplementary capital:		
Second 6 months of 1917.....	£21,783	(\$106,007)
First 6 months of 1918.....	21,167	(103,009)
25 per cent of the gross revenues of the Rio Mulato-Potosi line, after making a similar deduction:		
Second 6 months of 1917.....	6,629	(32,260)
First 6 months of 1918.....	5,411	(26,333)
Contribution from the national treasury, in accordance with clause 15 of the original contract.....	60,000	(291,990)
Interest advanced by the bankers on Government deposits.....	11,046	(53,755)
Annual quota of the Government of Chile.....	45,000	(218,993)
Sum taken from the Government deposits.....	16,464	(80,122)
Total.....	187,500	(912,469)

The total interest paid on the first mortgage bonds to the end of 1918 amounted to £1,443,892 (\$7,026,700), as follows:

Monthly contributions from the national treasury.....	£720,222	(\$3,504,960)
Interest derived from accounts current with the bankers:		
On capital of the second-mortgage bonds.....	377,403	(1,836,646)
On deposits.....	144,927	(690,688)
	270,000	(1,313,955)

Product of the rental of the following lines:

Viacha-Oruro.....	£211, 245 (\$1, 028, 024)	
Rio Mulato-Potosi.....	25, 997 (126, 514)	
		£237, 242 (\$1, 154, 538)
Total.....		1, 746, 797 (8, 500, 787)

There was deducted from this the following sums:

Stamps and other postal charges borne by the bankers...	223	(1, 085)
Amount held in power of the bankers.....	302, 682	(1, 473, 002)
		302, 905 (1, 474, 087)

Leaving a total paid on the first mortgage bonds amounting to.....

1, 443, 892 (7, 026, 700)

The roads controlled by the Antofagasta & Bolivia Co. in Bolivia consist of the main trunk line from the frontier at Ollague to La Paz by way of Uyuni, Oruro, and Viacha, and the Cochabamba, Potosi, and Atocha branches of the Bolivia Railway. These lines have a total length of 1,194 kilometers (742 miles). The dates of completion of the different links in this system were as follows:

Antofagasta-Uyuni.....	1889	Rio Mulato-Potosi.....	1912
Uyuni-Oruro.....	1892	Uyuni-Atocha.....	1913
Oruro-Viacha.....	1913	Oruro-Cochabamba.....	1917
Viacha-La Paz.....	1917		

Distances between the principal points on the main line are as follows:

	Kilometers.	Miles.
Antofagasta-Uyuni.....	612	380
Ollague-Uyuni.....	175	109
Uyuni-Oruro.....	313	188
Oruro-La Paz.....	237	147
Antofagasta-La Paz.....	1, 162	722
Viacha-La Paz.....	32	20

The 175 kilometers (109 miles) from Ollague to Uyuni is merely a prolongation of the Chilean section into Bolivian territory. As this section is of narrow 2.5-foot gauge, in contrast to the meter gauge of the other Bolivian lines, goods and passengers in the through traffic must be transferred at Uyuni. However, the laying of a third rail, now under way, will obviate the necessity for this transfer and enable cars to be routed through from one section to the other. The highest point between Antofagasta and La Paz is at Ascotan in Chile, a short distance from the border, where the line reaches a height of 12,979 feet. The maximum radius of curves for the entire Bolivian section of the Antofagasta & Bolivia Railway is 656 feet, and the maximum grade is 1.56 feet. Wood ties are used for 279 miles and steel for 46 miles. The rails between Ollague and Uyuni weigh 68.4 pounds to the yard, and from Uyuni to Oruro 60 pounds. There are 172 bridges and culverts, with a total length of 10,433 feet. The roadbed is kept in excellent condition, and the station buildings, though unpretentious, are well constructed of stone. Though there is heavy traffic on the Chilean section, which serves as outlet for the nitrate "oficinas," the mines of Chuquicamata and Collahuasi, and the vast borax deposits of Cebollar, there is little local business in the barren country between Ollague and Uyuni. However, at Uyuni the line receives heavy freights both from the main line to the north and from the At-

ocha branch to the south. For most of its length the course of the Uyuni-Oruro section lies across the great "meseta" or table-land, and thus roughly parallels the two main chains of the Andes, which wall in the plateau to the east and the west. The construction of this part of the road was comparatively easy, but north of Rio Mulato the line enters hillier country. The Rio Mulato-Potosi branch and the Patiño line from Machacamarca to Uncia both connect with this north-and-south trunk road. Minerals are also loaded at Poopo and Challapata.

The Oruro-Viacha section was built to connect La Paz and Oruro, thereby completing the unification of the national railway system. It is built for most of its length through a hilly region, though it emerges into level country before reaching Viacha. This line has a total length of 202 kilometers (126 miles), a minimum radius of curves of 251.4 feet, and a maximum grade of 3 per cent. Wood ties are used, and the weight of rails is 55 pounds per yard. The purely local traffic on this line is comparatively small, though the development of such mining centers as that of Caracoles should greatly increase this class of business.

Since September, 1917, trains from Antofagasta have entered La Paz over the company's own tracks. Formerly the only connection between the important junction point of Viacha (where the three lines from the coast converge) and La Paz was by the Guaqui line's extension. The high cost of the Antofagasta & Bolivia's new terminal section—about £400,000 (\$1,948,000)—was largely due to the difficulties of construction from the edge of the "alto" down into the city, to the terminus at the Chijini Station. Not only was this a difficult piece of railway engineering, but the entrance to La Paz over this line, which winds down the rugged walls of the deep basin in which the capital lies, forms one of the most picturesque approaches to any city in the world. The total length of the Viacha-La Paz connection is 32 kilometers (20 miles). The minimum radius of curves is 313.8 feet; the maximum grade is 2.67 per cent; the ties used are of steel; and the weight of rail is 60 pounds per yard. There are 73 culverts, with a total clearance of 383 feet; 5 bridges, with a total length of 485 feet; and 2 tunnels, with a total length of 682 feet.

The Bolivia Railway's Oruro-Cochabamba branch was opened to traffic in 1917, and the cost to the end of 1918 was £3,257,219 (\$15,851,256), or at the rate of more than \$100,000 per mile. The total length of the line is 211 kilometers (131 miles). The minimum radius of curves is 251.3 feet, and the maximum grade is 3 per cent. The ties are of wood and the rails weigh 55 and 60 pounds to the yard. There are 171 bridges, with a total clearance of 4,208 feet, and 5 tunnels, with a total length of 988 feet. After leaving Oruro, at an altitude of 12,122 feet, the line leads across the table-land for a short distance and then climbs to the divide of the Cuesta Colorada by a 2 per cent grade. On the other side it descends to the valley of the Arque by a remarkable piece of line, seven tracks being laid one above another at one place where the road zigzags down the mountain to reach the level of the valley. For most of its course thence into the plain of Cochabamba the line follows deep and narrow river valleys through a rugged mountain country. This circumstance, with the attendant landslides, washouts, and encroachments of the river

during the rainy season, has led to frequent interruptions of traffic, necessitating expensive repairs to the line. However, the railway company has put in some elaborate defensive works along the line to protect the track from rises of the river and from landslides, and in this way hopes shortly to normalize traffic over the line throughout the year. From the scenic standpoint the route has few equals in South America.

The Potosi branch of the Bolivia Railway leaves the main line of the Antofagasta & Bolivia at the Rio Mulato junction, which lies 105 kilometers (65 miles) north of Uyuni and 441 kilometers (274 miles) south of La Paz. The total length of the branch is 174 kilometers (108 miles). The Condor station on this line, at the point where the railway crosses the divide of the Cordillera de los Frailes, ranks with the Tiklyo station on the Cerro de Pasco line in Peru as one of the two highest points reached by a railway in the world, being at a height of over 15,800 feet above sea level. This line was opened to traffic in 1912, and its construction cost, to the end of 1918, a total of £1,540,378 (\$7,496,250). The minimum radius of curves is 251.4 feet, and the maximum grade is 3 per cent. Steel ties, weighing 46 kilos (101 pounds), are used and the rails weigh 60 pounds to the yard. Most of the road is built through very rough country, with very high embankments and deep rock cuts. The country along the line is thinly populated, the only station of importance between the two terminals being at Agua Castilla, where the product of the Porco tin mines is shipped. As a consequence, most of the business consists of through traffic between Potosi and Oruro or Potosi and Antofagasta.

The Uyuni-Atocha line constitutes the finished section of the road whose ultimate objective was Tupiza. The total length of the line, which had cost £532,230 (\$2,590,097) to the end of 1918, is 90 kilometers (56 miles). The line leads out from Uyuni across the alkaline plains for a considerable distance and then enters a highly eroded country that borders the mountains of Nor Lipez. The minimum radius of curves is 291.6 feet, and the maximum grade is 3 per cent. Steel ties are used and the weight of rails is 60 pounds to the yard. Most of the freight carried comes from the mines at Chocaya, from the Aramayo-Francke mines to the east of the railway, and from Argentina by way of La Quiaca and Tupiza.

In addition to the large amount of general freight which they carry, the lines under the management of the Antofagasta & Bolivia Co. serve as outlets for some of the richest mining districts in the country, such as those of Uncia, Llallagua, Oruro, Potosi, Colequechaca, Huanchaca, and Chocaya. The principal items of through freight traffic are the tin, silver, and other ores and concentrates from these mines. Practically all of the production of the Department of Potosi and much of that of Oruro is exported via Antofagasta. However, in the Department of Oruro the competition of the Arica, and to a less extent of the Mollendo, line begins to be felt. Comparatively little through freight is carried over the section between Oruro and Viacha, though considerable merchandise imported by Arica and Mollendo is sent through by this route for distribution in Oruro, Cochabamba, and other places.

Traffic returns for all the lines in 1918 were as follows:

Items.	Volume.	Receipts.	Items.	Volume.	Receipts.
Bolivia Railway:		<i>Bolivi- anos.</i>	Bolivia Railway—Continued.		<i>Bolivi- anos.</i>
Viacha-Oruro ¹ —			Uyuni-Atocha—		
Passengers.....	126,253	424,784	Passengers.....	16,215	55,291
Baggage.....tons.....	284	13,123	Baggage.....tons.....	51	1,795
Express.....do.....	1,227	49,409	Express.....do.....	260	10,479
Freight—			Freight—		
Imported goods...do....	23,802	571,216	Imported goods...do....	712	9,333
Exported goods...do....	12,243	296,312	Exported goods...do....	5,852	82,011
Local freight...do....	42,708	538,405	Local freight...do....	12,322	191,827
Telegrams, special trains, etc.....		16,762	Telegrams, special trains, etc.....		3,389
Total.....		1,913,011	Total.....		351,128
Rio Mulato-Potosi—			Antofagasta & Bolivia (Boli- vian section):		
Passengers.....	12,672	89,587	Passengers.....	220,970	640,438
Baggage.....tons.....	90	5,413	Baggage.....tons.....	461	17,150
Express.....do.....	291	23,331	Express.....do.....	2,775	86,031
Freight—			Freight—		
Imported goods...do....	6,472	108,085	Imported goods...do....	39,619	1,158,762
Exported goods...do....	7,241	171,152	Exported goods...do....	65,868	1,517,098
Local freight...do....	6,679	226,969	Local freight...do....	98,113	836,185
Telegrams, special trains, etc.....		10,364	Total.....		4,255,664
Total.....		634,901			
Oruro-Cochabamba²—			All lines:		
Passengers.....	72,826	360,877	Passengers.....	418,936	1,570,977
Baggage.....tons.....	108	7,816	Excess baggage.....tons.....	997	45,297
Express.....do.....	516	47,428	Express.....do.....	5,069	216,678
Freight—			Freight.....do.....	345,567	6,421,132
Imported goods...do....	294	8,193			
Exported goods...do....	381	7,597			
Local freight...do....	22,931	694,984			
Telegrams, special trains, etc.....		9,055			
Total.....		1,135,950			

¹ The receipts of this section in 1918 exceeded those of the year before by about 140,000 bolivianos.

² The average monthly receipts in 1918 were 91,663 bolivianos, as compared with 66,507 bolivianos in 1917, the first year of operation.

The results of the operation of the Bolivian section of the Antofagasta & Bolivia, as distinguished from the lines of the Bolivia Railway, in 1918, as compared with the previous year, are expressed below:

Items.	1917		1918		Increase (+) or decrease (-)		
	Pounds sterling.	Dollars.	Pounds sterling.	Dollars.	Pounds sterling.	Dollars.	Percentage.
Receipts.....	318,186	1,519,912	380,521	1,851,820	+ 62,038	+ 301,908	+ 19.48
Expenses.....	188,832	918,951	297,953	1,119,988	+ 109,121	+ 531,037	+ 57.79
Surplus.....	129,651	630,961	82,571	401,832	- 47,083	- 229,129	- 26.31

The following table gives figures for the passenger traffic:

Classes.	1917			1918			Percentage of increase.	
	Number.	Receipts.		Number.	Receipts.		In number.	In receipts.
		Pounds sterling.	Dollars.		Pounds sterling.	Dollars.		
First class.....	38,407	17,722	86,244	45,540	22,271	108,382	18.57	25.67
Second class.....	148,932	25,864	125,867	175,430	31,203	166,449	17.79	32.24
Total.....	187,339	43,586	212,111	220,970	56,474	274,831	17.95	29.77

In 1918 the tonnage of excess baggage and parcels was 3,236, as compared with 2,710 in 1917—an increase of 19.41 per cent.

Receipts from public telegrams amounted to £370 (\$1,803) in 1918, representing an increase of 59.22 per cent over the sum of £232 (\$1,133) derived from this source during the preceding year.

In 1918 the freight carried amounted to 203,930 tons, with receipts of £310,359 (\$1,510,362), against a tonnage of 197,185 and receipts of £265,931 (\$1,294,153) in 1917. The increase in tonnage, therefore, was 3.42 per cent and in receipts 16.71 per cent.

The traffic by classes is shown below:

Classes.	1917	1918	Increase (+) or decrease (-).	
			Tonnage.	Percentage.
	<i>Tons.</i>	<i>Tons.</i>		
Tin.....	70,606	75,440	+ 4,834	+ 6.85
Antimony.....	20,942	6,154	-14,788	- 70.61
Materials for mines.....	16,891	26,068	+ 9,177	+ 54.33
General merchandise.....	16,736	19,882	+ 3,146	+ 18.80
Silver.....	18,946	17,881	- 1,065	- 5.62
Huanchaca ores.....	11,686	10,554	- 1,132	- 9.69
Coal.....	11,937	13,515	+ 1,578	+ 13.22
Petroleum.....	3,698	1,282	+ 381	+ 15.79
Explosives and inflammables.....	3,427	3,163	- 264	- 7.70
Sugar.....	1,996	1,708	- 288	- 14.43
Coca.....	2,283	3,461	+ 1,178	+ 51.60
Livestock.....	756	1,890	+ 1,134	+150.00
Firewood.....	2,430	5,860	+ 3,430	+141.15
Cereals and flour.....	5,399	6,900	+ 1,501	+ 27.80
Company materials.....	32,889	36,351	+ 3,462	+ 10.53

The working expenses in 1918 were £297,953 (\$1,449,988), as compared with £188,832 (\$918,951) in 1917—an increase of £109,121 (\$531,037), or 57.79 per cent.

The complete traffic results of the entire Antofagasta & Bolivia system during 1918, with comparative figures for 1917, were as follows:

Items.	1917		1918		Increase + or decrease (-).		
	Pounds sterling.	Dollars.	Pounds sterling.	Dollars.	Amount.		Per-centage.
					Pounds sterling.	Dollars.	
Receipts.....	2,239,384	10,897,962	2,370,200	11,534,578	+130,816	+ 636,616	+ 5.84
Operating expenses...	1,252,060	6,003,150	1,482,287	7,213,550	+230,227	+1,120,400	+18.57
Net receipts....	987,324	4,894,812	887,913	4,321,028	- 99,411	- 483,781	-10.7

To the balance of revenue account, £887,913 (\$4,321,029), there was added:

Balance.....	£887,913 (\$4,321,029)
Interest on Bolivia Railway bonds (less tax)....	60,565 (294,740)
Registration fees, etc.....	220 (1,071)
Interest on investments and miscellaneous receipts.....	25,007 (121,697)
	973,705 (4,738,537)
Balance brought forward from 1917.....	291,803 (1,420,059)
Total.....	1,265,509 (6,158,596)

Against this amount the following appropriations were made:

Reserve account.....	£100,000 (\$486,650)
Staff benevolent fund.....	25,000 (121,663)
Income tax.....	145,216 (706,694)
Total.....	270,216 (1,315,007)

After subtracting £270,216 from £1,265,509, there was left the sum of £995,293 (\$4,843,589). Upon deducting for debenture-stock interest, interest on 6 per cent notes, dividends paid on preference and preferred ordinary stocks and interim dividend on deferred ordinary stock, and stamp duty, etc., on ordinary stocks—£464,677 (\$2,261,351)—there remained a balance available for distribution amounting to £530,615 (\$2,582,238).

A 10 per cent dividend was paid in 1918, and a bonus of 2 per cent in fully paid deferred ordinary stock was also paid. These payments required £237,600 (\$1,156,280), leaving a balance to be carried forward amounting to £293,015 (\$1,425,958).

According to the 1919 report of the board of directors, the results of operations for that year were as follows: Receipts, £1,316,592 (\$6,553,190), a decrease of 43.19 per cent as compared with 1918; operating expenses, £881,715 (\$4,290,866), a decrease of 40.52 per cent; net receipts, £464,877 (\$2,262,324), a decrease of 47.64 per cent.

Interest on Bolivia Railway bonds to the amount of £73,584 (\$358,097) was added to net receipts. A total of £444,167 (\$2,015,544) was available for distribution after certain expenses

had been met. The regular 5 per cent was paid on the cumulative preferred stock and preferred ordinary stock. A $2\frac{1}{2}$ per cent dividend was paid on the deferred ordinary stock in addition to an extra dividend of $6\frac{1}{2}$ per cent on the same class of stock. The decrease in receipts from traffic for 1919 was largely due to the reduction in shipments of nitrate. However, this traffic was renewed with large shipments during the early part of 1920.

As for results of operation of the Bolivian section, traffic fell off on the Oruro-Viacha and Rio Mulato-Potosi lines, and remained about stationary on the Uyuni-Atocha and Oruro-Cochabamba lines.

The present capital stock of the Antofagasta & Bolivia Co. consists of £2,000,000 (\$9,733,000) of 5 per cent cumulative preferred, £2,000,000 of preferred ordinary, and £2,161,600 (\$10,519,426) of deferred ordinary, or a total of £6,161,600 (\$29,985,426). At their 1920 meeting the directors voted to increase the capitalization to between £7,578,560 (\$36,881,062) and £8,000,000 (\$38,932,000) through the creation of £1 (\$4.87) ordinary shares.

ARICA-LA PAZ RAILWAY.

The Arica-La Paz Railway (Ferrocarri! de Arica a La Paz) is a Chilean State line and was built in accordance with the treaty of 1904 between Bolivia and Chile and a convention of June 27, 1905. By these agreements Chile bound itself to build a railway from the port of Arica to La Paz as compensation for Bolivia's definitive renunciation of Antofagasta. The line was opened to traffic in May, 1913. The contract for building the line, which was granted to Sir John Jackson & Co., called for the expenditure of £1,645,000 (\$8,005,393) on the Chilean section and £1,105,000 (\$5,377,483) on the Bolivian section, or a total of £2,750,000 (\$13,382,876). However, the total cost is said to have been near £3,000,000 (\$14,600,000), because of the difficulties encountered in the Chilean section. According to the provisions of the treaty of 1904 the Bolivian section of the railway is to become the property of the Republic of Bolivia in 1923.

The line is administered from the office of the director general of the Chilean State Railways in Santiago, but the local administration centers in Arica. There is also a local agent in La Paz and a commercial agent in Oruro.

This is the shortest of the three lines between the coast and La Paz, the total distance being 446 kilometers (281 miles). However, as the trains enter La Paz from the "alto" over the tracks of the Antofagasta & Bolivia, the last few miles do not form a part of the Arica-La Paz system. Shortly after leaving Arica the line enters the fertile valley of the Azapa, which it follows for a considerable distance before it climbs into a mountainous defile and begins the ascent of the Cordillera Occidental or Western Range of the Andes. Between kilometer 70 at Central and kilometer 113 at Puquios there is a rise of 2,247 meters (7,370 feet) in a distance of 43 kilometers (28 miles), with a maximum gradient of 6 per cent. For 22.29 miles of this section the rack-and-cog system is used. The highest point on the line is at Jeneral Lagos, where it reaches an altitude of 13,960 feet. After climbing onto the plateau the line passes to the

left of the peak of Tacora, where important "solfataras" are worked and crosses the frontier near the Bolivian town of Charana, which is the point of departure for the projected cut-off to Oruro. In 1914 a spur was built in from the Tarejra station of this line to the important copper-mining center of Corocoro, a distance of 8 kilometers (5 miles). This short branch is the property of the Bolivian Government.

The Chilean section has a total length, exclusive of sidings, of 128.21 miles, a minimum radius of curves of 328 feet, and a maximum grade of 6 per cent. Steel ties are used for 19.5 miles. The weight of rail used is 55.7 pounds per yard. There are seven bridges, with a total clearance of 476 feet, and 5 tunnels, with a total length of 2,398 feet.

The Bolivian section has a total length of 145 miles without sidings, a maximum radius of curves of 328 feet, and a maximum grade of 2.04 per cent. Wood ties are used throughout, and the weight of rails is 55.7 and 61.1 pounds to the yard. There are 39 bridges, with a total clearance of 2,706 feet.

The equipment of the Arica-La Paz line consists of 10 locomotives and 288 cars of all kinds. Two of the locomotives are rack engines. The most successful locomotives used on the line are the large Baldwins which have been recently acquired. Locomotives on this line are put to a severe test as a result of the heavy grades and the extremes of temperature in the mountain region. On the writer's journey from La Paz to Arica the train was forced to change engines four times as a result of breakdowns between La Paz and Puquios. The freight cars used are of steel, with galvanized-iron roofs.

A weekly passenger train is run between Arica and La Paz. This train, which carries compartment sleeping cars and a dining car, besides first and second class coaches, leaves Arica at 4 p. m. on Mondays and arrives at La Paz the next day at 2.20 p. m. The down train leaves La Paz at 4 p. m. on Thursday and reaches Arica the following day at 1 p. m. The time from Arica to La Paz is thus 22½ hours and in the opposite direction 21 hours. The fare for the through trip is 66.50 Chilean pesos or 34.90 bolivianos.

Because of its shortness this line is destined to be of great importance to the economic development of the northern part of the Bolivian plateau. Though it is forced to compete with the Mollendo line for the traffic of this region, it has certain advantages over that line as a freight road. Both freight and passengers are carried directly into La Paz without transshipment, whereas on the Mollendo line goods are transshipped at Puno and Guaqui and on the Antofagasta line transshipment is necessary at Uyuni. However, the development of the business of this line has been greatly hindered by its lack of adequate rolling stock. As a consequence of the frequent congestion of traffic it has been necessary at times to send out freight by Mollendo or Antofagasta whose logical outlet was by Arica. This has even happened with copper from Corocoro, which had to be shipped by Mollendo through an arrangement with the Guaqui line for the use of its cars. One factor in causing this congestion has been the rack section, where the special type of locomotive used is able to haul but a few cars at a time. This necessitates several trips in order to take up an ordinary train of loaded cars. The management of this railway is also handicapped by its being

Government owned, whereas its competitors are private enterprises. However, the Chilean Government has recently ordered additional rolling stock and a serious effort is being made to improve the freight service. With sufficient cars and locomotives this line should not only control the external traffic of most of the Department of La Paz but should be able to take much more of the traffic of the Oruro and Cochabamba districts than now falls to its share. For some classes of freight its zone of attraction could also be extended into the Department of Potosi. At present Corocoro copper constitutes one of the most important items of its business.

The volume of traffic on the Bolivian section during 1918 was as follows:

Passengers.....	29, 802
Excess baggage and parcels.....	metric tons.. 430
<hr/>	
Freight:	
Imports.....	do. 36, 599
Exports.....	do. 36, 219
<hr/>	
Total.....	72, 818

Receipts from traffic for 1918 are not yet published. The total volume of all classes of freight for the first five years of the operation of the line were as follows: 1913, 47,000 metric tons; 1914, 72,000 tons; 1915, 97,000 tons; 1916, 105,000 tons; 1917, 216,000 tons. This includes local business on both sections of the line. In 1917, 26,323 passengers were carried. The gross receipts for the 1917 traffic were as follows:

	Chilean pesos.
Passengers.....	307, 964
Excess baggage and parcels.....	43, 838
Freight.....	2, 983, 202
<hr/>	
Total.....	3, 470, 715

Though the net receipts are not made public, it is known that this line has operated at a profit, being the only one of the Chilean State railways to have a favorable balance.

GUAQUI-LA PAZ RAILWAY.

The Guaqui-La Paz Railway was completed into La Paz in 1905, being the first line to bring La Paz into railway communication with the coast. It was built by the Bolivian Government for the purpose of giving the plateau region an outlet to the Pacific at Mollendo in Peru. The Southern Railway of Peru was opened as far as Arequipa in 1871 and by 1876 had reached Puno on Lake Titicaca. Previously, commerce between Bolivia and the coast had been carried on by means of mules and llamas and over trails that terminated at either Arica or one of the northern Chilean ports. The construction of a railway from Lake Titicaca to La Paz was authorized by a law of October 25, 1900, during the Pando administration. The initial costs of construction were to be met from the proceeds of the alcohol monopoly and a tax on rubber in the Department of La Paz. The line was inaugurated as far as El Kenko on the heights above La Paz in October, 1903, and the final section into the city was completed in November, 1905.

The railway was subsequently leased to the Peruvian Corporation on consideration of receiving 40 per cent of the annual gross receipts. After 1910 this was to be reduced to 30 per cent for four years, but after 1914 the original percentage of rental was to go into effect again. Meanwhile the amount of the Government's obligations to the bondholders who had financed the construction of the line rose to £220,000 (\$1,070,630). The Government's recognition of its inability to meet this debt led it to sell the line outright to the Peruvian Corporation. The sale, which took place on July 15, 1910, was made for the sum of £374,912 (\$1,824,509). At the same time the Guaqui mole was leased for 15 years on payment of 35 per cent of the gross receipts of traffic using this wharf. The Government retained the privilege of expropriating the railway after 10 years. The Peruvian Corporation carries the Guaqui-La Paz line at a value of £396,320 (\$1,928,691).

Between Mollendo and Puno, Bolivian traffic uses the line of the Southern Railway, which passes through Arequipa and Juliaca. At Puno goods are transshipped to the steamers of the Lake Titicaca Navigation Co., which is also a subsidiary of the Peruvian Corporation. From these steamers freight is transferred at Guaqui to the cars of the Guaqui-La Paz Railway.

The distance between La Paz and Guaqui is 97.4 kilometers (60 miles). The line passes through Viacha, and from El Kenko, at the edge of the basin in which La Paz lies, the trains are taken into the city below, a distance of 9.4 kilometers (5.8 miles) by means of electric locomotives. The total distance between Mollendo and La Paz is 529 miles.

The maximum grade on the steam section is 2 per cent and on the electric section 7 per cent. The ties used are of Oregon pine. Light rails weighing 40 pounds to the yard are used on the steam section and 60-pound rails are used on the electric section. The rolling stock consists of 6 locomotives, 11 passenger coaches on the steam section and 4 on the electric section, 2 baggage coaches, and 23 freight cars. There are 2 steam locomotives of 28 metric tons, 1 of 29 tons, 2 of 46 tons, and 1 switching engine of 15 tons. The total capacity of the 11 passenger coaches is 507 persons.

The general manager of this road has offices in the Challapampa Station at La Paz. The general manager of the Southern Railway of Peru is an American, whose headquarters are at Arequipa.

A biweekly passenger service is operated between La Paz and Mollendo. Details of this service will be given in the Appendix under the heading "Travel Notes" (see p. 256).

In spite of the efforts of its management to attract traffic over this route by the reduction of freights and by offering other inducements, the Guaqui line has lost ground to its rivals. Though its Pacific terminal of Mollendo is farther up the coast than Arica and Antofagasta and so nearer the United States and Europe, it suffers, in comparison with the Arica route, from its greater length and from the necessity of transshipment at the lake. To obviate the latter difficulty it has been proposed to build a line around the lake between Puno and Guaqui. However, the difference in gauge between the Bolivian and Peruvian sections of the system would prevent the benefits expected from such a connection unless a third rail were laid. The country exclusively tributary to it—the zone about Lake Titi-

caca—is of comparatively small commercial importance, as it contains no large towns and none of the great mining centers. The line must be able to draw on the region farther to the south in order to insure its successful operation.

The traffic returns on the Guaqui line for the fiscal years 1917-18 and 1918-19 were as follows:

Items.	1917-18		1918-19	
	Pounds sterling.	Dollars.	Pounds sterling.	Dollars.
Gross receipts.....	56,299	273,979	51,025	248,313
Operating expenses.....	47,599	231,641	45,589	221,859
Net receipts.....	8,700	42,338	5,436	26,454

The decrease of freight traffic for these two years amounted to 19,130 tons, the falling off in imports through Mollendo being 14,369 tons. In 1917-18 the number of passengers carried was 78,766, and in 1918-19 it was 59,316. During 1919 1,716 passengers were carried in the international service. During the first six months of 1920 the quantity of freight carried by the Guaqui line fell from 2,041,859 kilos in January to 508,866 kilos in June, largely as a result of the strained relations which prevailed during that time between Bolivia and Peru.

There is a keen rivalry between the three routes for the external freight traffic of Bolivia. In this competition the Arica route has rapidly gained an increasingly important position.

TAREJRA-COROCORO RAILWAY.

The Tarejra-Corocoro Railway, which is only about 5 miles long, is in reality a spur of the Arica-La Paz Railway. It was built by the Bolivian Government in order to give the Corocoro copper-mining district direct access to the international line to Arica. It is operated by the section of railways of the Ministry of Public Works and Industry. Its construction was authorized in 1911, and the line was opened to traffic in 1914. The line is valued at 520,296 bolivianos. The traffic returns for 1918 were as follows:

Items.	Volume.	Receipts.
		<i>Bolivianos.</i>
Passengers.....	15,546	11,671
Baggage and parcels..... metric tons..	479	2,157
Freight..... do.....	31,434	95,104
Miscellaneous.....		5,330
Total.....		114,262

The gross income since its opening to traffic has been as follows: 1914, 37,033 bolivianos; 1915, 84,634 bolivianos; 1916, 100,114 bolivianos; 1917, 128,257 bolivianos; 1918, 114,262 bolivianos.

MACHACAMARCA-UNCIA RAILWAY.

The purpose of the construction of this line was to give the mining district of Uncia an outlet to the main line of the Antofagasta & Bolivia Railway. The line, which is being built by Sr. Simon Patiño, the owner of the Uncia tin mines, starts from the Machacamarca station of the Antofagasta & Bolivia, and at the beginning of 1920 was open to traffic to kilometer 60, with a biweekly train service each way. It was planned to complete the road to Uncia, 44 kilometers (27 miles) farther, during 1920. This railway, which also serves the mines of Huanuni and Llallagua, is later to be prolonged to Colquechaca.

The traffic carried by the road during 1918 was as follows:

Items.	Volume.	Receipts.
Passengers.....	32,445	<i>Bolivianos</i> , 69,779
Excess baggage and parcels.....metric tons..	722	13,762
Freight.....do.....		544,253
Total.....		627,794

Traffic receipts were about 100,000 bolivianos more than during 1917.

UYUNI-HUANCHACA LINE.

This short line was built from Uyuni to the mines of Huanchaca-Pulacayo by the Compañía Huanchaca de Bolivia, which owns these mines. The distance from Uyuni to Pulacayo is 32 kilometers (20 miles). The extension from Pulacayo to Huanchaca is about 6½ miles long, with a tunnel 2 miles in length. The minimum radius of curves is 360 feet and the maximum grade is 3.25 per cent. The company owns five locomotives, some old passenger coaches, and a number of freight cars. The section from Uyuni to Pulacayo cost £47,357 (\$230,463). The line is used for carrying supplies to the mining camp and for taking out ores for transshipment at Uyuni to the coast.

COCHABAMBA-VINTO AND COCHABAMBA-ARANI LINES.

These two short lines, which run out of Cochabamba, are operated by a local power company, known as the Empresa Luz y Fuerza Eléctrica de Cochabamba. One of these roads leads through the Punata Valley by way of a number of important towns to Arani, a distance of 62 kilometers (38½ miles). The other, and shorter, line goes by Quillacollo to Vinto. The company holds concessions for the extension of the former line as far as Totora on the road to Santa Cruz, and for the prolongation of the Vinto line to Sipesipe. The latter line roughly parallels the Bolivia Railway's line through the same territory. The construction of these narrow-gauge lines antedates that of the railway from Oruro, all the materials having been brought in by cart from the latter point.

For the construction of the company's lines a loan of £300,000 (\$1,459,950) was contracted for in London in 1910. The annual service on this loan, which is guaranteed by the Bolivian Govern-

ment, amounts to £18,000 (\$87,597). At the end of 1919 the total payments on the loan had reached £85,440 (\$415,794), leaving an unpaid total of £214,560 (\$1,044,156), which at the legal rate of exchange then in force amounted to 2,682,000 bolivianos, as against the equivalent of 3,668,790 bolivianos owed in 1910. The total capital at present amounts to 2,515,900 bolivianos in addition to the amount of the original London loan. Part of this is invested in the so-called "unguaranteed section" of the company's properties—that is, in lands, an electrically operated flour mill, the tramways of the city of Cochabamba, and other holdings. The largest shareholder in the company is Sr. Simon Patiño, the tin-mining magnate. Sr. Patiño holds nearly 30,000 shares of stock, out of a total of 50,318 shares, which represents the 2,515,900 bolivianos of capital referred to above. This was brought about by Sr. Patiño's subscribing an additional £120,000 (\$583,980) to the former capital stock of the company. After Sr. Patiño, the most important stockholders are the Suarez rubber interests, Gustavo Hinke & Co., and the Banco Hipotecario Nacional.

During 1919 the operation of the railway lines of the company showed the following results:

Items.	Receipts.	Expenses.
	<i>Bolivi- anos.</i>	<i>Bolivi- anos.</i>
Cochabamba-Vinto line.....	141,149	92,464
Cochabamba-Arani line.....	298,129	222,148
Deterioration of line and rolling stock, and fund for renewal.....		70,000
Net balance applied to service on London loan.....		54,366
Total.....	439,278	439,278

During the same period the profits from the other operations of the company—electric light and power, tramways, etc.—amounted to 96,344 bolivianos.

The locomotives used on the Arani line are small, German, wood-burning engines. The increased difficulty of obtaining a constant supply of firewood has added considerably to the cost of operation of this section, but the company is making plans for the electrification of this line. The company places the total value of its rolling stock at 505,719 bolivianos.

A daily train is run between Cochabamba and Arani, which covers the distance in about four hours, or at the rate of about 9 miles an hour, including the unnecessarily long stops at each station. The first-class fare between the two points is only 3.60 bolivianos, and half that for third class. Because of the propensity of the natives for railway traveling and the low third-class fares, the passenger traffic is heavy. During 1919, 19,254 first-class, 69,988 second-class, and 342,285 third-class tickets were sold, making a total of 431,527 passengers carried, representing total fares of 213,654 bolivianos. During the same time 12,424,435 kilos of freight were carried, with a total return of only 84,475 bolivianos. The comparative insignificance of the freight business on this line is due to the competition of the burro traffic on the good road that parallels the railway. However, receipts from freight traffic almost trebled during the three

years 1917-1919, after having remained stationary during the three previous years.

The trains on the short Vinto line, which is only 18 kilometers (11 miles) long, are drawn by electric locomotives, current for which is supplied from the company's power station at Incachaca. At this place, which is situated in a mountain canyon to the northeast of Cochabamba and well on the road that leads down into the Yungas, 1,000 horsepower is utilized. The present installation, which is of German manufacture, has a capacity of double the amount of current generated, while the water available at Incachaca could develop 4,000 horsepower. At this point a mountain stream has been canalized and led along a ridge until it falls 200 feet into the turbines at the power plant. This station not only furnishes current for the Vinto line but supplies power and light to the city of Cochabamba and operates the local tramway lines.

During 1919 the total number of passengers carried on this line was 539,118, divided as follows: First class, 42,435; second class, 47,292; and third class, 449,391. The returns from this traffic amounted to only 135,750 bolivianos. During the same year 2,135,449 kilos of freight were carried, the receipts from freight traffic amounting to only 5,399 bolivianos. Neither freight nor passenger traffic on this line increased during the six years 1914-1919, while operating expenses increased to such an extent that profits from operation fell from 80,103 to 48,685 bolivianos.

RAILWAYS UNDER CONSTRUCTION.

YUNGAS RAILWAY.

A line known as the Yungas Railway, or Ferrocarril de La Paz a Yungas, is now being constructed to connect the plateau with the Yungas region. The initial studies for this route were made by engineers of the Bolivia Railway Co. and of the Bolivia Colonization & Development Co., which was one of the interests of the famous Farquhar Syndicate. A national law of November 17, 1914, provided for the building of an electric tramway from La Paz to "the Provinces of the Yungas," with the view of later prolonging the line to a navigable point on the River Beni. Construction was begun in April, 1915, and the first section to the summit was opened to traffic on October 20, 1919, work having been greatly retarded during the war by the inability to obtain materials from abroad and also by the lack of funds. The moving spirit of the enterprise has been the Bolivian engineer, Sr. Carlos Tejada Sorzano, who has had charge of the work of construction as Director General of the State Railways.

The railway, which started with a fund of 14,000 bolivianos, cost to the end of 1919 approximately 6,366,000 bolivianos, including advances made to the contractors for 1920. During 1915, 387,068 bolivianos were expended; during 1916, 396,831 bolivianos; and during 1917, 988,085 bolivianos. A series of laws placed additional resources at the disposal of the work, largely in the form of departmental taxes of various kinds, including a tax of 1 boliviano per metric quintal on all foreign merchandise entering the Department of La Paz. The departmental budget for 1918 provided for the

raising of the following sums for the prosecution of work on the railway:

	Bolivianos.
Tax of 1 boliviano per quintal on imports into the Department .	395, 579
Tax on exportation of copper produced in the Department. . . .	145, 088
30 per cent of profits from Government tobacco monopoly.	181, 487
Income derived from operation of other State railways.	49, 309
Quota of departmental tax on coca.	145, 833
Interest on deposits.	2, 399
Total.	919, 695

In January, 1917, a loan was placed through the New York banking firm of Chandler & Co. for the sum of \$2,400,000. At a rate of 90 this loan yielded \$2,160,000, or 5,465,986 bolivianos. The rate of interest was placed at 6 per cent with amortization at 2 per cent, making an annual service on the bonds of \$192,000, which is payable semiannually. The Equitable Trust Co. was associated with Chandler & Co. in the placing of the loan. An effort was made in 1920 to secure an additional loan in the United States, but negotiations were stopped by the revolution in July. In 1918 the Director General of Railways estimated the total cost of the line to Coroico at 15,280,000 bolivianos, but a commission appointed to study the project in that year put the probable cost at 20,875,000 bolivianos. The first section of 26.5 kilometers (16½ miles) cost 2,484,090 bolivianos, or at the rate of £7,643 (\$37,195) to the kilometer. The director general, Sr. Tejada, declares that a maximum average cost of £8,000 (\$38,900) per kilometer can be maintained as far as Pongo, which is 20 kilometers (12½ miles) beyond the divide, but that the cost per kilometer from that point to Chaco, a distance of about 26 kilometers (16 miles), will increase to between £10,000 (\$48,700) and £12,000 (\$58,400) per kilometer. However, this cost is lower than that of most of the Bolivia Railway Co.'s lines, notably of that between Oruro and Cochabamba. During the first half of 1920 about 250,000 bolivianos a month was being spent on the work of construction. After the line leaves the gorge of the Unduavi on its course toward the low country about the Beni, the cost of construction per kilometer will decrease greatly.

Very few lines anywhere have presented such difficulties as does the building of this transandine railway. In the 74 kilometers (46 miles) of the Unduavi Canyon above the Puente de Chupe the line falls 3,500 meters (about 11,480 feet). Between kilometers 49 and 64, though the horizontal distance is less than 5 kilometers (3.1 miles), the distance by the route of the railway is 15 kilometers (9.3 miles), with a fall of 717 meters (3,575 feet). For one section 22 kilometers (14 miles) of railway are needed to cover a distance of 10 kilometers (6.2 miles) in the air line, and there is a drop of 1,500 meters (4,920 feet). This necessitates the use of the longest stretch of 6 per cent grade on any line in the world. Below the Quebrada, or gorge, of Anasani, which begins at about kilometer 70, the grade will be reduced to 3 per cent, while the fall of the Tamampaya Valley below the Puente de Chupe (kilometer 106) is between 1½ and 2 per cent.

Not only are the mountainsides, along which the line must be built, extremely steep, but the character of the rock formation makes the building of a solid roadbed very difficult. Much of this formation

consists of slate and shale, whose strata lie parallel to the slope of the mountainside, thus increasing the probability of slides. As a result, masonry bulwarks have had to be put in over long stretches to keep the roadbed from slipping. In other places the gravelly composition of the ground makes it difficult to anchor the track. Added to these difficulties is a heavy and humid growth of vegetation, which it is very hard to clear off and next to impossible to burn, even during the dry season.

In June, 1920, about 3,000 workmen were engaged in the construction work along the route through the Unduavi Canyon. These men were paid an average wage of 2.40 bolivianos a day. The laborers were Indians and cholos from across the divide, as the natives of the Yungas are too few in numbers and unfitted for this kind of work.

It has been difficult to hold these workmen, as they tend to drift back to their homes on the "altiplano" or to go to other localities where higher wages are paid.

By the middle of 1920 rails had been laid almost to the Rinconada camp (kilometer 35), and the preparation of the roadbed was under way as far as Yerbabuenani (kilometer 62). It was then proposed to have the rails laid as far as Pongo (kilometer 46) by the end of August, but construction was stopped by the revolution which occurred in July and by the expatriation of the director general of railways. Foreign engineers who have gone over the line declare the work to be of a very high quality, including the tunnel and bridge work so far completed. No switchbacks or cog tracks are to be used, but the excessive differences in levels are overcome by means of compensated grades. The amount of earth work is very large, the excavations amounting to 70,000 cubic meters (91,553 cubic yards) per kilometer (0.62 mile) over a considerable part of the route. The ties used are of redwood, which cost at the rate of \$3 gold apiece.

The present equipment of the line includes two Shea locomotives, which were bought in 1917 at \$9,000 each. Another of these engines, which have been found excellently adapted to mountain use, was ordered during 1920. In addition, the rolling stock consists of 21 cars of various kinds, which were purchased from the United States.

Traffic was opened to the Cumbre or summit in October, 1919. A weekly passenger service is maintained over this section of the line, the train leaving the Chijini Station at La Paz at 7.30 a. m. on Thursdays, and returning the same day. The one-way first-class fare is 5.20 bolivianos, and half that for second class. Traffic is still light, as the Indians, who drive pack animals to and from La Paz over the Yungas road, do not break their journey at the end of the railway.

Though there has been much discussion as to the exact route which the railway is to follow after leaving the gorge of the Unduavi, the town of Coripata has been fixed as the immediate objective of the line. The law of December 18, 1918, which prescribed this route, also provided that a branch should be extended on from Coripata to Coroico. In order to conciliate the interests of the Province of Sur Yungas, it is understood that another branch is to be built to Chulumani from the neighborhood of the Bridge of Chupe, which is the geographical center of the entire region. The ultimate objective of the line is the head of steam navigation on the River Beni, which may be placed at Rurrenabaque, about 218 miles from

La Paz. There is a choice of three routes to the Beni, according as the line follows the valley of either the Coroico, the Tamampaya, or the La Paz. Whatever route is chosen for the purpose, the work of construction on this final stage of the line will be much easier than on the initial sections into the Yungas.

The following table will show the distances from La Paz and the height above sea level of different points on the route.

Places.	Distance from La Paz.		Altitude.	
	Kilometers.	Miles.	Meters.	Feet.
Cumbre (Abra de Huacayo).....	26½	16½	4,640	15,223
Rinconada.....	35	22	4,496	13,766
Pongo.....	46	29	3,630	11,909
Cucuta.....	49	30	3,418	11,214
San Felipe.....	62	39	2,720	8,921
Yerbabuenani.....	63½	39½	2,592	8,501
Neque Jahuira.....	70	43	2,070	6,791
Chaco.....	78	48	1,895	6,217
Puente Anasani.....	80	50	1,759	5,741
Puente de Chupe.....	106	66	1,118	3,668
Coripata.....	126	78	1,674	5,492
Coroico.....	161	100	1,725	5,659
Chulumani.....	131	81	1,730	5,676
Rurrenabaque.....	350	217		

Because of the high price of coal and the presence of large stores of water power along the route of the railway, it has been decided to electrify the line. On March 26, 1920, a contract was signed in New York between the Bolivian consul general and Maj. James P. Bradner, U. S. A., for the making of the necessary studies. Maj. Bradner went over the route in June and reported favorably on the possibilities of electrification. There is no question as to the adequacy of the water supply, but the principal problems presented are those of the location and installation of the hydroelectric plant, as the porous character of much of the rock presents difficulties in the construction of a dam.

The freight traffic of the Yungas section of the line will consist largely of agricultural products of the region, such as coca, coffee, and fruits, all of which are capable of production in much greater quantities. Other items in the freight business of the road will be minerals and firewood. The large stores of small timber in the Yungas can be drawn on to supply the serious dearth of fuel on the plateau. In addition, this promises to be the finest scenic line in South America and one of the finest in the world. When once the region of the Beni is reached, the volume of freight should increase greatly. Though still largely virgin territory, this rich area is capable of great development as soon as a market is found for its potential products. This traffic should consist of lumber, cattle, cotton, cacao, and tobacco. In fact, the significance of the Yungas Railway largely lies in its opening up the Beni country rather than in its position as a local road to serve the Yungas district.

ATOCHA-LA QUIACA.

The bridging of the gap between the Bolivian and Argentine railheads at, respectively, Atocha and La Quiaca is of great importance in that this railway will furnish through connections between the two

Republics and direct communications between La Paz and Buenos Aires. At present the 125 miles which lie between Atocha and La Quiaca must still be covered by mule, though the road is passable by automobile from about the middle of May to about the middle of November. Atocha is the southern terminus of the Bolivia Railway's branch from Uyuni, where connections are made with the main line of the Antofagasta & Bolivia. La Quiaca is the northern terminus of the Argentine Central Northern, a government-owned, meter-gauge line, which makes connections at Tucuman with the Central Argentine and the Central Cordoba for Buenos Aires. It is situated on the frontier and directly opposite the Bolivian village of Villazon. Almost midway between the two points lies the town of Tupiza, which forms the dividing line between the two sections in which the railway is to be built. The existing trade route, which the line of the railway will roughly follow, leads through a region of mountains, running along the rocky bed of a river and across upland pampas or plateaus for much of the way.

The effect of the railway, when completed to Atocha, will undoubtedly be to strengthen greatly the commercial relations between Bolivia and Argentina. It will not only offer a better market to some of the products of the Provinces of Jujuy, Salta, and Tucuman, but will furnish the means of importing manufactured goods into Bolivia from as far as Buenos Aires—a traffic that has hitherto been seriously handicapped by the difficulties of transport between the frontier and the Bolivian railhead at Atocha. It should thus enable Argentine manufacturers to compete with those of Chile, as well as with American and European products in the same lines, unless the through freight rates should prove prohibitive. Some of the mineral production of the Lipez and Chichas Provinces to the south of Uyuni should also find an improved outlet by this route, though much of this must continue to go around by Antofagasta.

Imports from Argentina into Bolivia through Villazon during 1918 amounted to a total of 7,049,812 kilos (kilo=2.2046 pounds), representing a value of 3,196,962 bolivianos, or 9.13 per cent of the value of all imports into Bolivia during the same year. Part of this traffic was diverted directly to the northeast from Villazon to Tarija and thus was not carried over the road by Tupiza and Atocha. The principal items imported were horses, cattle, flour, sugar, and relatively large imports of cotton goods, cashmires, patent leather for shoes, and women's wearing apparel. During 1918, 6,307,448 kilos were exported through the same customhouse, to a value of 5,289,733 bolivianos, or only 2.9 per cent of the value of all Bolivian exports for that year. The principal articles of export were as follows:

Articles.	Kilos.	Bolivianos.
Lead bar	1,549,000	1,779,982
Tin bars	387,942	1,563,118
Antimony ore	615,000	517,122
Copper ore	256,684	568,002
Bismuth	33,120	318,971
Wool	152,923	190,130
Hide	199,397	137,911

As a passenger line this railway will offer another transcontinental connection between the west coast and the River Plate. Travelers landing at Mollendo or Arica, bound for Buenos Aires, would be able to cut two or three days off the time by Valparaiso and the Transandine Railway. In winter the saving should be even greater, as this line would always be free from snow. If an international agreement were made to that effect, through trains could be run between La Paz and Tucuman, so that passengers disembarking at Arica would only be obliged to change at these two points on their way to Buenos Aires. However, much of its advantage as a transcontinental passenger route would be nullified by the construction of the proposed line between Antofagasta and Salta, which would furnish a shorter cut-off across the Andes than would be supplied by either the Arica-Oruro-La Quiaca connection or that by Antofagasta-Uyuni-La Quiaca.

By a law of December 5, 1912, the Bolivian Congress authorized the contracting of a loan for £1,000,000 to finance the building of the section of the railway between Tupiza and La Quiaca. On February 1, 1913, the French *Crédit Mobilier* agreed to take the loan at 90 per cent net, with interest at 5 per cent and amortization at 1 per cent. The capital and interest were to be paid in pounds sterling at the fixed exchange rate of 25.20 francs to the pound.

Negotiations for the construction of the line were opened with the French firm of Vezin et Cie., and on August 23, 1915, the Congress accepted the Vezin proposals. The Vezins agreed to build the line for £900,000 (\$4,379,850) and to complete it within three years. Construction was actually begun on September 20 of the same year, and 48 kilometers (30 miles) of roadbed were completed before the work was suspended. Disagreement between the Government and the contracting firm had meanwhile arisen over some of the details of construction, and the contractors alleged war conditions as the reason for their inability to prosecute the work in accordance with the original program. At the time the Government agreed to the rescinding of the contract, but Vezin et Cie. demanded 3,640,874 francs (\$702,689) as compensation in addition to the payments that had already been made for the work completed. Through negotiations between the French Minister in La Paz and the Minister of Public Works an agreement was arranged for the continuation of the work. The time for completion was extended two years, but on condition that the company should be fined 200,000 francs (\$386,000) for each month of delay beyond this time. The first 48 kilometers (30 miles) were to be railed at once, though at that time it was difficult to obtain rails abroad or to secure their delivery. Shortly after this, news reached Bolivia of the death of M. Vezin, the head of the contracting firm, upon which efforts were begun in the Bolivian Congress to secure the nullification of the contract. The Vezin heirs demanded 1,840,756 bolivianos for the liquidation of the contract. The Government objected to this sum as excessive, but agreed to pay 780,000 bolivianos in case certain specific claims of the Vezins were found justifiable. It was then proposed to make a physical valuation of the work already done by the Vezin contractors as a basis for further proceedings. With this understanding the contract was formally abrogated by the Congress late in 1919.

In accordance with a law of May 12, 1920, a contract was signed on June 16 between the Bolivian Government and the firm of Lavenas, Poli & Co. for the completion of the work left unfinished by the Vezins. This Argentine company had acted as subcontractor under the Vezin contract and was thoroughly familiar with conditions of construction on the route. At the time the Lavenas-Poli contract was made the Government had expectations of placing a loan in the United States, part of the proceeds of which was to be applied to financing this work. However, the revolution of July interfered with the Government's plans in this connection and prevented a renewal of construction. Subsequently the contract with the Argentine firm was annulled for nonfulfillment.

According to a report from Vice Consul Nelson R. Park, at La Paz, under date of March 12, 1921, a contract has been signed between the Bolivian Government and an American firm for the financing and construction of the railway from La Quiaca to Atocha. The American company engages to negotiate a loan of \$7,000,000 in favor of the Bolivian Government to cover the expense of construction and equipment of this railway, and to complete the road by August 1, 1925. As the work progresses, completed sections of 10 kilometers are to be turned over to the Bolivian Government. Thirty miles of the railway from the La Quiaca end are ready for the laying of the rails, and other parts of the La Quiaca-Tupiza section, 62 miles long, are also under construction. The Tupiza-Atocha section, 64½ miles in length, has not yet been started. Total expenditures on the entire La Quiaca-Atocha line up to November 25, 1920, principally payments to previous contractors, have been 4,663,509 bolivianos.

The Antofagasta & Bolivia Railway Co. formerly held a concession for the construction of the section from Atocha to Tupiza, which is in reality merely the continuation of the Bolivia Railway's route from Uyuni, on which work was abandoned after Atocha was reached. However, on this company's failure to complete the road to Tupiza, the Government decided to undertake the work on its own account. In December, 1916, the Congress authorized the raising of £1,000,000 by means of a foreign loan. Early in the following January the President issued a decree to this effect, with the provision that the Government's shares in the Banco de la Nación, together with a mortgage on the line to be built, would be offered as guaranty. However, negotiations with American bankers fell through, and the work was deferred to a more favorable time.

POTOSI-SUCRE.

The Potosi-Sucre line is being built to give the old capital of Bolivia an outlet over the main railway system of the country. At present Sucre, which lies about 170 kilometers to the northeast of Potosi, is largely isolated during part of the rainy season, as, during this time of the year, the regular automobile service between the two cities is suspended and traffic is limited to mules.

Though this railway had been discussed for a long time, nothing definite was done until 1916. In January of that year Congress asked for proposals for construction. The Government offered a 6 per cent guaranty for 20 years, and offered as security for the guaranty the following resources: The sum of 2,034,547 bolivianos

deposited in the Banco de la Nación, with interest on this sum; a tax of 1 boliviano on every metric quintal of foreign merchandise destined for the Departments of Chuquisaca and Potosi; and 100,000 bolivianos annually for 10 years, beginning in 1917. Construction was started in November, 1916, and the first locomotive reached the town of Betanzos, about 55 kilometers (34 miles) out of Potosi, on June 30, 1918. This is less than one-third of the total distance, and, moreover, the country still to be traversed is extremely rough. The most difficult feature of the work in this section is the crossing of the deep valley of the Pilcomayo.

The slow progress made on the line has been due, not only to the difficult nature of the country traversed, but also to the lack of funds. Resort has been had to special taxes and to both internal and foreign loans, but none of these have yielded the amounts expected. To June 30, 1918, the Government had turned over 3,950,000 bolivianos for use on the line, or about 150,000 bolivianos in excess of the total yield of all the resources devoted to the work. In 1918 the following special funds were collected:

	Bolivianos.
Tax of 1 boliviano per metric quintal on foreign merchandise introduced into the Departments of Potosi and Chuquisaca.....	287, 296
Tax of 20 per cent on importation of foreign liquors.....	21, 456
Revenue derived from the tobacco monopoly.....	181, 486
Tax on sale of "aji" in Department of Chuquisaca.....	9, 657
Revenues appropriated from the treasury of Potosi.....	55, 720
Patents on oil lands.....	58, 210
Interest on deposits.....	583
Total.....	614, 408

A law of October 5, 1918, provided for the raising of a £1,000,000 loan for the work, but the Government was unable to place the loan abroad. Efforts at an internal loan failed, but three banks agreed to advance the Government 1,950,000 bolivianos to carry on the work. Meanwhile, the special revenues enumerated above are being collected, though their annual yield fluctuates considerably and their aggregate is not sufficient to give a vigorous impulse to the work.

Early in 1920 a semiweekly passenger service was opened between Potosi and Betanzos, but freight traffic has not yet been initiated. Although the line when completed will be of great advantage to the city of Sucre and its tributary country, it is highly doubtful whether there will be sufficient traffic for many years to pay a return on the large investment necessary for its completion.

PROJECTED RAILWAYS.

COCHABAMBA-SANTA CRUZ.

A line to connect Santa Cruz with the plateau is one of the most imperative railway needs of Bolivia. This need is not only economic, but political, for such a line would not only give the needed impulse to the development of the fertile but now almost stagnant region of Santa Cruz, but would link that isolated portion of Bolivia with the rest of the Republic—a measure that might be necessary to insure the territorial integrity of the nation. At present communications between the two parts of the country are limited to long mule trails through the intervening mountains. The total distance between

Cochabamba and Santa Cruz by the Totora-Samaipata trail is about 269 miles, which it requires nearly two weeks to cover on muleback. The narrow-gauge railway of the Empresa Luz y Fuerza follows this road for more than 60 kilometers (32 miles) out of Cochabamba, or as far as Arani. Thence to Totora, 90 kilometers (49 miles) farther, the road can be used by automobiles during part of the dry season. Beyond Totora the road leads through extremely rugged country until it reaches the plains in which Santa Cruz lies, some of the ranges cutting transversely across the route followed by the road.

Three different routes have been suggested from Cochabamba, though in each of these there are many variations of detail. Also, there are local interests that favor Sucre as the terminal for a line to Santa Cruz, though the burden of disinterested opinion is in favor of Cochabamba. The route generally proposed is that which would follow approximately the present mule trail by Totora and Pampagrande. A second route would strike northeastward across the mountains from Cochabamba to the low country about the Chimore, whence it would follow the base of the foothills of the Andes around by Buenavista to Santa Cruz. Such a line would give Cochabamba connections with both the Beni and Santa Cruz regions. It would, however, necessitate a large amount of bridge building, and the maintenance of the line in the rainy montaña region would be difficult and costly. The third alternative would be a line by the valley of the Rio Grande. The railway either would enter the valley directly at Capinota, on the line between Oruro and Cochabamba, or would climb over into the valley of the Rio Mizque from some point in the Punata Valley and continue thence to the junction of the Mizque with the Rio Grande. This route would offer a natural and easy gradient all the way to Santa Cruz, but over against this advantage there must be set the length of the route, due to the long detour of the Rio Grande to the south, and the probability of slides and wash-outs on a line which would have to be built on a ledge in a deep river valley.

The cost of building the road by any of the suggested routes would be great. An American engineer, who made a thorough reconnaissance of the Totora route early in 1920, estimated the probable cost by that route at between \$40,000,000 and \$50,000,000, with the likelihood that the cost would be nearer the latter than the former figure. Either figure would place the cost per mile at more than \$100,000.

The construction of such a line has long been under consideration in spite of the general realization of the heavy cost. The Government began to set aside the income from certain revenues in 1916 to be devoted to the cost of financing its construction. To the end of 1918 the special sources of income devoted to the work produced the following sums: 1916, 55,537 bolivianos; 1917, 320,870 bolivianos; 1918, 242,789 bolivianos; total, 619,196 bolivianos. In addition to this sum, 131,047 bolivianos raised from taxes on the introduction of foreign merchandise into the Department of Santa Cruz and on alcohol and brandy were set apart for this purpose, making an aggregate of 750,243 bolivianos. At the figure given above this would provide for the construction of less than 3 miles of line.

A national law of December 3, 1917, authorized the construction of a line to connect the two cities, and a presidential decree of Decem-

ber 28 reconfirmed the earlier laws which destined the following resources to a fund for such a railway:

The sum forfeited by a former railway concessionaire for failure to carry out the terms of his concession, amounting to 125,000 bolivianos.

Tax of 1 boliviano per metric quintal of foreign merchandise destined to consumption in the Department of Cochabamba, as provided by law of October 19, 1916.

Same for Department of Santa Cruz, as provided by law of November 24, 1915.

The product to be derived from the consolidation of rubber lands in the Departments of Cochabamba, Santa Cruz, and El Beni, in accordance with a law of November 8, 1917.

Tax on State lands acquired by individuals, as fixed by law of November 8, 1917, and the proceeds of any subsequent taxes of the same character.

The Government has shown no disposition to put a tax on land for the purpose of raising money for the building of this or any other railway. To carry out an enterprise of this magnitude a foreign loan would have to be raised on a scale far in excess of all such loans hitherto contracted by the Bolivian Government. The traffic that would be carried by a line from Santa Cruz would include sugar, cotton, tobacco, cattle, hogs, hides, hay, lumber, and, in all probability, petroleum.

COCHABAMBA-EL BENI.

Another long-standing railway project is that for linking up the city of Cochabamba with the plains country of the Beni region. At present communications between these two districts are furnished by the mule trail over the Cordillera Oriental to Todos Santos on the Chimore and the launches from the Mamore which ply up the Chimore to that point. Several years ago a concession was granted to Sr. Simon Patiño for the construction of a railway line to connect the plateau at Cochabamba with some point in the upper Mamore Basin. There has been much lack of agreement as to the route to be followed. One route would terminate at the junction of the Chimore and the Ichilo, while an alternative route would follow the Rio Isoboro, along which the concessionaire has vast holdings of land, to a point where the river is navigable for steamers. Construction by either route would entail an enormous outlay of money, as railway building in both the mountain region and the lowlands, which are inundated for several months in the year, would be extremely difficult and costly. Sr. Patiño's concession, after several previous extensions, was renewed for another six months early in 1920, but the chances are small that work will be undertaken under this concession. A railway to the Beni would furnish a much-needed connection between the highland region of Cochabamba and the rich but undeveloped plains country to the northeast, which now finds its most practicable outlet through the Amazon, but the problem of financing such a line constitutes a most serious obstacle to its construction.

SANTA CRUZ-PARAGUAY RIVER.

There have been several projects for giving the Santa Cruz region a railway outlet to the Paraguay River. Efforts were made in the eighties by Miguel Suarez Arana, the founder of the Empresa Nacional de Bolivia en el Paraguay, to run a cart road to Puerto Pacheco, but the scheme was frustrated by the occupation of that excellent river port by the Paraguayans, who still hold it. In 1889 the English firm

of Perry, Cutbill, De Lungo & Co. proposed to the Bolivian Government to build a railway from Puerto Pacheco to Sucre, and another from the Laguna de Gaiba into the Itenez country, but nothing came of these proposals. In 1900 a Belgian company, known as L'Africaine, presented proposals for a line from Bahía Negra, on which Puerto Pacheco is located, to Santa Cruz. The cost was to be about \$12,000,000 and the proposals included an ambitious scheme for the development of eastern Bolivia. The concession granted to this company expired in 1914, similar proposals having been made in the meantime by Italo-Argentine interests under the name of the Sindicato Fomento del Oriente Boliviano. Proposals were also made by the Bolivian Development & Colonization Co., a branch of the Farquhar Syndicate, for a railway from the interior of Bolivia to Puerto Suarez or Bahía Negra, and these were accepted by the Bolivian Government in August, 1911. However, this concession, which also comprehended a grant of 1,000 square leagues of State lands, has expired, and there is at present no concession in the field. However, certain Brazilian interests made overtures to the Bolivian Government in 1919 for the prolongation of the Northwestern Railway of Brazil from Porto Esperanca, its present terminus, by way of Corumba and Puerto Suarez to Santa Cruz. Construction of a line across eastern Bolivia should be comparatively easy, as grades would be negligible and in no part would there be required cuts or fills more than 5 meters (16 feet) in depth. The completion of lines between the Paraguay River and Santa Cruz and between Santa Cruz and Cochabamba, a total distance of about 800 miles, would supply the necessary links for the establishment of a trancontinental line from Santos to Arica. In lieu of the completion of the latter line, the building of a road from the Paraguay into Santa Cruz would offer an outlet to the entire Santa Cruz region, whose great potential resources must lie fallow until some such outlet is made available.

SANTA CRUZ-ARGENTINA.

There have also been several projects for a railway line to connect Santa Cruz, via Yacuiba, with the Argentine system of lines. In November, 1911, a concession was granted to a British firm to build such a line, to be known as the Eastern Railway of Bolivia, but this scheme shared in the general collapse of most of the vast designs of the Farquhar Syndicate, which took over the project. At present a project is on foot for the building of a railway from Sucre to the lower Pilcomayo, with an outlet to the Paraguay River at Formosa over the Argentine State Railway, which is being built northwest to Embarcacion. Embarcacion is the present railhead for the Central Northern's branch from Perico and is also the southern terminus of the long road from Santa Cruz in Bolivia. The new project is connected with the plans of the William Braden interests (Argentine-Bolivian Exploration & Development Co.) for the development of the oil fields in the Lagunillas district east of Sucre. The proposed concession also provides for a branch from Lagunillas north to Santa Cruz.

GUAYARAMERIN-RIBERAITA.

A law of December 4, 1911, granted to the Madeira-Mamore Railway Co., in accordance with the terms of the treaty of Petropolis of 1903, a contract for the building of a line from Guayaramerin to

Riberalta. The construction of this line would amount to the extension of the Madeira-Mamore Railway across the Mamore and into Bolivian territory as far as Riberalta at the forks of the Beni and the Madre de Dios. The total distance between these two points is about 186 miles. Some work was done by the concessionaires in surveying this route and in preparing the right of way, but the project was abandoned several years ago. Largely for political reasons, the Bolivian Government has shown little interest in the completion of this line.

LA QUIACA-TARIJA.

The construction of a railway from La Quiaca-Villazon northeast 85 miles to the isolated town of Tarija has been discussed for many years, but nothing definite has yet been done to further this project. At present the Department of Tarija is dependent for outside connections on mule trails that terminate at either La Quiaca or Embarcacion.

ROADS.

CONDITIONS OF ROAD BUILDING.

Because of the topography and climate of the country, road building in Bolivia is attended with peculiar difficulties. Most of the roads lie among the mountains and have the general characteristics of Andean highways. Pack animals—mules, burros, and llamas—comprise the usual means of transportation, and the roads are often only the narrow “caminos de herradura,” or pack trails, required for that kind of traffic. These roads climb the sides of steep mountains, cross the desolate “puna” of the higher altitudes, wind along rocky defiles whose beds are filled during the rainy season with rushing streams, and skirt the edge of dangerous precipices. In places they are too narrow for two laden pack trains to pass, and sometimes scarcely wide enough for one. Sometimes after heavy rains part of the trail will slip into the valley below, leaving the road hanging in space. Though mules are best adapted to travel over such roads because of their sure-footedness, their bodies are sometimes seen at the bottom of deep canyons, where they have fallen from the road above. During the rainy months, even pack-train traffic over the mountain trails is greatly impeded, and automobile traffic is suspended over the better roads between December and May. After the end of the summer it is usually necessary to make elaborate repairs over long stretches of the mountain trails and roads, where the heavy rains have caused slides and washouts.

On the comparatively level “meseta” or table-land the building of roads is very easy. There the pack trains are accustomed to follow the shortest line from place to place, and the paths thus worn by their hoofs generally constitute the only roads of the region. During the dry season these roads are satisfactory for ordinary demands, but after the annual rains have set in much of the plateau is covered with a shallow layer of water, or where the roads are not entirely inundated they often become nearly impassable because of the deep mud. This condition prevails to an even greater extent in the vast plains of eastern Bolivia, where roads may be utterly parched during the dry season and be turned into bogs during the wet summer months. In the level districts of the Republic, especially in the Beni and

Santa Cruz, ponderous ox-carts are much used for heavy hauling, and they are also utilized on the plateau for such purposes as the transportation of mining machinery or other heavy goods to points inaccessible by rail. Bullocks are also much ridden in eastern Bolivia, not only because of their cheap cost, but because their large splay hoofs are well fitted for traveling across either sandy or muddy country.

In the building of roads, picks and shovels are about the only tools used. Modern road-making machines, such as scrapers and rollers and stone crushers, have not been introduced into Bolivia. Ordinary manual labor is so cheap and the funds available so limited that it is doubtful whether much of a market could be developed for such machinery in the present state of the country. Anything approaching the average outlay per mile for good roads in the United States would be utterly out of the question in a country with the limited resources and small population of Bolivia. However, in spite of the limited facilities at hand, the mountain roads are often very well built, being well drained and having a hard, smooth surface. Some very substantial stonework is used to support these roads, and even some mule trails, where they run along the sides of the mountains, as in the Yungas, command the admiration of the traveler. However, these roads generally lack the strong base of a macadamized highway and so are severely damaged by the heavy summer rains.

The expense of road building in Bolivia is borne by the national "prestación vial," or road tax, and by special appropriations, either national or departmental. All males in the country between the ages of 18 and 60 are required to pay the small road tax or, in lieu of the payment of this sum, to work out the tax on the roads of the Department. In practice the system usually amounts to a corvée of the able-bodied Indians, supplemented by the quotas paid by the whites and certain of the cholos. An example of departmental action is the law of January 11, 1919, authorizing the Department of Potosí to raise a loan of 500,000 bolivianos for roads to Tupiza and Camargo. Where the need for a particular road is especially urgent and the ordinary resources of the "prestación vial" and the departmental treasury are inadequate, the National Government sometimes makes an appropriation for its construction. The administration of the national system of roads is under the control of the Section of Bridges and Roads of the Ministry of "Fomento" or Public Works. The total appropriations for road building between 1906 and 1916 were as follows, 60 per cent of these coming from the National Treasury: 1906, \$536,400; 1907, \$362,080; 1908, \$400,400; 1909, \$329,424; 1910, \$190,640; 1911, \$236,800; 1912, \$103,600; 1913, \$129,200; 1914, \$103,600; 1915, \$44,800; 1916, \$6,000. These sums include Government subsidies to transportation companies, which supplied cart or automobile service between important centers. A few toll roads have survived in parts of the country, but these highways are gradually being acquired by the Government.

During the past few years there has been a considerable increase in the mileage of roads suitable for automobile traffic, and it is the policy of the Government to continue the building of good roads as fast as the resources at its disposal permit. The most used of this class of roads are included in the following list:

FIG. 9.—PACK TRAIN ON MOUNTAIN ROAD.

FIG. 10.—VALLEY ROAD BELOW LA PAZ.

Points connected.	Length in miles.	Points connected.	Length in miles.
Potosi-Sucre.....	106	La Paz-Sorata.....	93
Cochabamba-Sucre.....	191	La Paz-Oruro.....	144
Atocha-La Quiaca.....	125	Cochabamba-Sacaba.....	9
Arani-Totora.....	51		

ROADS OF DEPARTMENT OF LA PAZ.

A number of roads lead out from La Paz in various directions. To the northwest one goes by Huarina and Achacachi, on Lake Titicaca, to Sorata, whence a trail leads over the Cordillera down into the Beni. In 1920 this road was opened for motor traffic, a regular automobile service having been previously operated as far as Achacachi. Sorata is a pleasant town lying at an altitude of 8,888 feet and about 150 kilometers (93 miles) from La Paz. The automobile which leaves La Paz in the morning arrives at Sorata the same afternoon. This road was a favorite project of a former American minister who now resides in La Paz. From Achacachi a trail continues along the shore of the lake and north across the Province of Munecas and the high Andes by Pelechuco to Apolo, the capital of the Province of Caupolicán. There is another very old road from La Paz west by Tiahuanaco and Guaqui and around through Peruvian territory to the peninsula and town of Copacabana, the favorite shrine of pious Bolivians.

A road, now little used but formerly of considerable importance, leads southwest across the Province of Pacajes and over the divide to Tacna. Before the building of the Arica-La Paz Railway, trains of mules and llamas from Bolivia were common sights in the streets of Tacna. The road which branches off at Viacha for Corocoro ultimately joins this road for the coast. The old cartroad or "carretera" to Oruro goes southeast by Sicasia, paralleling for much of its way the main line of the railway. The Rio Abajo or "down-river" road follows the river valley out of La Paz and among some Indian villages that lie under the shadow of Illimani. Before it reaches Palca it is only a mountain trail, branches of which go off to Luribay or over a high pass into the Inquisivi country and down into the Yungas to Irupana near the forks of the La Paz and the Miguilla. Here these roads connect with those that come around from La Paz by the Unduavi Canyon and Chulumani.

In spite of the great natural obstacles to their construction and maintenance, the Yungas roads are surprisingly good. Because of the steep slopes of the mountains, in the sides of which the roads are cut, long stretches must be rebuilt after the rainy season. These roads, which are used only by mules and burros, follow the valleys or the sides of the mountains—in places at a height of more than a thousand feet above the bottom of the valley and sometimes with a sheer drop of hundreds of feet from the side of the road.

The roads are largely kept up by an association of the landowners of the district, known as the Sociedad de los Proprietarios de los Yungas. A toll charge of 10 centavos is levied on each pack animal entering or leaving the Yungas. The resources of the "prestacion vial" or road tax are also utilized for the support of the roads.

The principal road of the region is that which leads from La Paz over the divide and down the valley of the Unduavi to a point where

it sends off branches to the north and south. The first of these branches goes by Coripata to Coroico, the capital of the Province of Nor Yungas, and the other leads to Chulumani, the capital of Sur Yungas. A cut-off to Coroico from the main road was closed during 1920 because it interfered with the construction work on the railway. The distance from La Paz to Coroico via Coripata is about 93 miles, which can be covered by mule from the end of the railway at the divide in about three days. The distance to Chulumani is about 81 miles, or about two and a half days by mule. From Chulumani the trail leads over two high ridges for about 12 miles to the town of Irupana, from which point there are connections, through the Inquisivi district, with the Bolivia Railway at Eucalyptus, or by the La Paz River with the city of La Paz.

About 5,000 mules and burros pass over the La Paz-Yungas road every day. The road can be used for carts for about 30 miles out of La Paz, or to about 14 miles beyond the summit. Bids were asked for the improvement of the road to the summit during 1920 so that it may be used for automobile traffic. Farther from La Paz the road is only a broad mule trail, with grades of 30 per cent and over for considerable distances. Rates for mules from La Paz to Chulumani vary from 12 to 20 bolivianos per mule, depending on the scarcity of pack animals and the season of the year. There is a lack of food for animals in the Yungas, and large quantities of barley are brought in from the plateau to supply the deficiency. The months of June and July are the best time of the year for visiting the Yungas. Travel during the rainy season is attended with serious inconveniences and at times is next to impossible. During the summer of 1920 the road was completely blocked by heavy rains for several days.

There are both telegraph and telephone connections between La Paz and the principal centers of the Yungas.

ROADS OF DEPARTMENT OF ORURO.

A series of important roads radiate from Oruro or leave the line of the railway for some mining district in the mountain country. An example of the latter is the cart road from Challapata to Colquechaca, which is sometimes traveled by automobiles. The old "carretera" between Oruro and Cochabamba has lost much of its importance since the opening of the railway between the two cities. However, considerable numbers of cattle for the Oruro market are driven over it, and there is still a large burro and mule traffic over this route. Human labor and time are of such little value in this region, and burros in particular are so cheap, that it is difficult for railway competition to affect this pack-train traffic in certain lines of freight. The road, which passes through the rich Quillacollo valley before entering Cochabamba, is kept in fairly good condition and with a relatively small amount of work could be made suitable for motor traffic. A motor cycle has reached Cochabamba over this road, but it has not yet been traversed by an automobile. A much-traveled road leads to the mining district of Uncia and Llallagua, the center of the Bolivian tin-mining industry, which is accessible for motor vehicles for part of the year. Across the Province of Carangas there are also pack trails, which fork at the town of Corque, one of them continuing on to the coast at Arica and the other reaching the seaboard farther

to the south at Pisagua and Iquique. However, these long roads to the coast are now little used. Another road leads around the southern end of Lake Poopo to the "salinas" or salt marshes of Garcimendoza.

ROADS OF DEPARTMENT OF COCHABAMBA.

Cochabamba has probably the largest mileage of good roads of any department in Bolivia, as it has also the largest agricultural acreage and the heaviest population per square mile. According to the prefect, about 360 miles of these roads can be used for automobile traffic during a part of the year. The longest single extent of such road is that section of the road to Sucre which lies within the Department of Cochabamba. This highway leads through the thickly populated Punata Valley to its termination at Arani, which is also the terminus of the narrow-gauge railway from Cochabamba. Thence for about 60 miles its course leads through a wild mountain country, following the ridge at a height of more than 11,000 feet for much of the way. It then drops down about 3,000 feet into the Valley of Mizque, from which it crosses a barren moor country into the Aiquile Valley. From the Valley of Aiquile it climbs over the low Sierra de Catariri and follows thence a small tributary of the Rio Grande, which it crosses by a suspension bridge into the Department of Chuquisaca. From about the middle of May to about the middle of November this road is open for automobile traffic between Cochabamba and Sucre. This motor service is operated by the same company that maintains the automobile line between Sucre and Potosi—the Empresa de Automoviles J. Moscoso. The cars, which are large 10-passenger American machines, make the trip twice a week, covering the distance of some 225 miles in about 16 hours of actual traveling. The one-way fare between the two points is 60 bolivianos. There is little through freight traffic on this road, but it forms the outlet for the Mizque and Aiquile Valleys, and to a certain extent for that of Vallegrande, besides some haciendas that lie nearer Sucre.

Another road leads from Cochabamba northeast through the fine Sacaba Valley and over the mountains by Colomi down into the Yungas of Cochabamba and the lowland country to the head of launch navigation on the Chapare at Todos Santos. For about half the year a regular automobile service is maintained between Cochabamba and Sacaba, a distance of about 9 miles, though the road can be used for automobiles as far as Colomi. Beyond this point it is only a bad mule trail which forms, however, the only connection between Cochabamba and the Beni region. A branch of the "valley road" by Punata leads off from Punata by Tiraque and the Rio Lope de Mendoza to Montepunco, through which there are connections across the Yungas of Arepucho with the country about the Chimore. A cart road about 25 miles long also leads from Parotani (on the line of the railway to Oruro) to Tapacari, which lies near the Kani mining district.

ROADS OF DEPARTMENT OF POTOSI.

The principal road of the Potosi district is that which connects the cities of Potosi and Sucre, a distance of about 171 kilometers (106 miles). This road was built by a British engineer and is one of

the most remarkable pieces of highway construction in Bolivia. The most difficult part of its course is that section where the road zigzags down into the valley of the Pileomayo and climbs to the top of the mountain range on the other side. At this point the valley is nearly 3,000 feet deep. The river is crossed here by a suspension bridge about 650 feet long. In the entire distance between Potosi and Sucre there is scarcely a 100-yard stretch of straight road. The automobile service which is maintained over this road between the middle of April and the middle of November is conducted by the Empresa de Automoviles J. Moscoso. This concern receives a subsidy from the National Government. American chauffeurs are employed for driving the large cars used. The cars cover the distance between the two places in about 9½ hours. The fare charged for the trip is 60 bolivianos, and there is a high charge for baggage. When the cars start from the end of the railway at Betanzos, instead of leaving from Potosi, the charges are considerably less.

The ordinary means for carrying freight between the two cities is by mule, and this is also the only means of passenger travel during that part of the year when the automobile service is suspended because of the rains. A good mule will carry about 3 Spanish quintals, equivalent to a little over 300 pounds, and the rates charged by the "fleteros" or freighters varies from 3 to 9 bolivianos per quintal, depending on the character of the merchandise, the scarcity of animals, and the supply of forage for the mules. The normal rate is about 5 bolivianos per quintal. The pack trains make the trip from Potosi to Sucre in four or five days. For bulky goods, which can not be carried by mule, oxcarts are used.

Other roads, used by mules, lead northwest to Challapata on the main line of the railway, and south by Cotagaita to Tupiza. Traffic has greatly declined on the latter road, over which ores from Potosi were formerly sent into Argentina. Trails branch off from this road across the mountains into the Camargo district of the Province of Cinti and down into the Tarija country, to the southeast.

The road from Uyuni southeast to the Argentine frontier has been mentioned in connection with the proposed railway connection between Atocha and La Quiaca, which are the terminals of most of the traffic over most of this route, since Atocha constitutes the present railhead of the main Bolivian system. Atocha is a squalid village of about 250 inhabitants, with a post-office and a telegraph office, where messages are relayed to Argentina from the north. There are two small "hotels," where very poor accommodations are provided for travelers who are unfortunate enough to miss connections with the trains or automobiles or who travel this way by mule in the rainy season. Tupiza, which serves as a halfway station on the road, is a place of about 1,500 people, situated in a well-cultivated valley at an altitude of about 3,000 meters (9,850 feet). Villazon, the actual southern terminal of the road, is a small village separated by a creek from the Argentine town of La Quiaca. Its commercial importance is still largely limited to the presence of the Bolivian customhouse at this point. La Quiaca is situated in the Argentine Province of Jujuy, about 155 miles north of the city of that name. It lies at an altitude of 3,412 meters (11,293 feet). The population is between 2,000 and 2,500.

There is a large mule traffic over this road, though both llamas and oxcarts are used for hauling freight. Mules, which can be hired from "arrieros" at either end of the line, make the trip in four to five days. For passengers the rate per mule for the trip is between 35 and 40 bolivianos. Freight pays at the rate of 10 centavos per kilo, though the rate may vary according to the state of the road and the abundance of forage for the animals. During the height of the rainy season travel is very difficult, even by mule. From about the middle of May to about the middle of November a regular automobile service is maintained for the transportation of passengers. The company that operates this service owns 10 cars, most of them of the Mercedes (German) type, with a total capacity of about 60 passengers. The fare for the trip is 70 bolivianos, and the charge for excess baggage above the very small maximum allowed each passenger is 1.75 bolivianos per 5 kilos. The schedule for this service is given in the Appendix under the heading "Travel Notes."

ROADS OF DEPARTMENT OF CHUQUISACA.

The roads from Potosi and Cochabamba have already been described. The latter road, after leaving Sucre, descends to the valley of the Rio Chico, which is followed for about 35 miles, crossing its dry bed during the winter season, when the road is open, more than a hundred times. After passing the confluence of the Rio Chico with the Rio Grande the road enters the Department of Cochabamba, through which its course has been described. A road leads east from Sucre by Tarabuco and Padill to the region of Lagunillas, which is known in Sucre as "the frontier." This road can be used by automobiles as far as Tarabuco and is a fair highway as far as Padilla, but beyond this point it is only a bad mule trail. This road is used for sending merchandise from Sucre to the smaller towns to the east and for bringing tobacco and alcohol into Sucre.

ROADS BETWEEN THE PLATEAU AND THE PLAINS COUNTRY.

One of the most important problems of the Bolivian Government has been the closer binding of the remote eastern part of the Republic with the plateau by means of improved transportation routes. The projects for the extension of the Yungas Railway to the Beni and for a railway to Santa Cruz have already been described. The problem of building roads between the two regions is made all the more difficult, not only by the great distances which must be traversed, but by the difference in altitude between the two sections of the country, which amounts to 10,000 to 14,000 feet. At present there are a number of routes from the "altiplano" to the plains of the Beni and Mamore basins, which require from 10 days to 2 months to cover.

From La Paz the most traveled route is that by Sorata and Mapiri. For part of the year the stage from La Paz to Sorata can be made by automobile. From Sorata there is a four-day mule journey to Mapiri, which lies about 1,500 feet above sea level. At Mapiri it is necessary to take a canoe, paddled by Indians, in which one travels as far as Rurrenabaque on the Beni. This stage of the journey is made in 5 to 7 days, largely depending on the quantity of water in

the rivers. Rurrenabaque is the head of steam navigation on the Beni, and the distance thence to Riberalta, amounting to about 763 kilometers (474 miles), is covered by launch in about 6 days. There are thus about 17 days of actual traveling between La Paz and Rurrenabaque. Sometimes it is necessary to go around by land from Rurrenabaque to Puerto Salinas, in case the launch is not able to get over the Altamirani Pass between these two points, which lie about 22 kilometers (14 miles) apart. The different stages by this route are as follows:

	Kilometers.	Miles.
La Paz-Sorata; automobile (or mule).....	150	93
Sorata-Mapiri; mule.....	160	99
Mapiri-Rurrenabaque; canoe.....	437	272
Rurrenabaque-Riberalta; launch.....	763	474
	<hr/> 1,510	<hr/> 938

Another route is by way of Lake Titicaca and the Madre de Dios, part of the journey being across Peruvian territory. The stages by this route are:

La Paz-Guaqui; rail, Guaqui-La Paz Railway.
 Guaqui-Puno; lake steamer.
 Puno-Tirapata; rail, Southern Railway of Peru.
 Tirapata-Candamo; mule.
 Candamo-Puerto Maldonado; canoe, Tambopata River.
 Puerto Maldonado-Riberalta; launch, Madre de Dios River.

The journey from La Paz to Tirapata, which is 72 miles from Puno, requires about a day. From Tirapata to the Tambopata is about 6 days by mule. However, there are 200 kilometers (125 miles) of good mountain road from Tirapata to the Inca Gold Mining Co.'s properties, and this is regularly traveled by automobile. The trip from Candamo to Puerto Maldonado on the Madre de Dios requires about 6 days by canoe and the descent of the Madre de Dios about seven days by launch, or a total of about 20 days of actual traveling.

There are also two or three routes which lead from La Paz through the Yungas into the Beni basin. One leads by the Coroico and Carauavi Rivers, and another by the Miguilla and Bopi. At Puerto Pando these routes converge with that from La Paz by Sorata-Mapiri. Canoes ascend the Miguilla to a short way below Irupana in South Yungas, which lies about 175 kilometers (110 miles) from La Paz. The 150 kilometers (93 miles) between the end of the Yungas Railway and this point must be covered by mule.

From Cochabamba the most direct route into the Beni country is by way of the Chapare. The successive stages of this road are as follows:

	Kilometers.	Miles.
Cochabamba-Sacaba; automobile (or mule).....	10	6
Sacaba-Santa Rosa; mule.....	243	151
Santa Rosa-Trinidad; launch.....	172	107
	<hr/> 425	<hr/> 261

After leaving the Valley of Cochabamba this road leads through a country of mountains and dense forests, where both the building and the maintenance of roads are extremely difficult and costly, not only because of the physical character of the region, but also on account of the devastating work of the torrential rains of the wet season. This road has been a notoriously bad one, the trail in some places

being scarcely wide enough for a single laden mule to pass, as at the dangerous Sal-si-puedes Pass. However, the road is being radically improved by a battalion of sappers, under the command of an army officer of long experience in tropical Bolivia. Not only is the route of the old trail being modified, but the road is being extended beyond Todos Santos across the Mojos plains to Trinidad, the capital of the Department of El Beni. Though the road will be made more serviceable for mule traffic, parts of it must still remain impassable during the height of the rainy season. The mule trains from Cochabamba with cargo for the Beni now unload their freight at Santa Rosa or at Todos Santos, which lies about 20 miles farther down the Chapare. Here it is transferred to the launches owned by Barber & Co., or during times of low water to long canoes and "batelones," which are the typical river craft of the Beni region. The distance from Trinidad to Riberalta is about 700 kilometers (435 miles), which is covered by launch as far as Guayaramerin, and thence overland to Riberalta by mule. A second road leads from Cochabamba by way of Totora and the Chimore to Trinidad, a total distance of about 564 kilometers (350 miles).

The long road from Cochabamba to Santa Cruz leaves the Punata Valley at Arani, and thence continues eastward by Totora, Chilon, and Pampagrande through a rugged mountain country, until it enters the vast plains of eastern Bolivia a few leagues outside of Santa Cruz. Some of the roughest country traversed lies among the last Andean ranges in the vicinity of Samaipata. There are many precipitous climbs and descents, and traveling is very difficult during the rainy season, when the trail is muddy and slippery and the streams are full. Though the road begins at Cochabamba, there is a railway line as far as Arani, and from this point to Totora there is a regular automobile service for part of the year. Beyond Totora the road is passable only for mules, which can cover the remainder of the journey in 8 to 10 days or the entire trip in about two weeks. Mules can be hired or bought at Punata or other places in the neighboring valley and muleteers engaged for the journey. Rates on freight to Santa Cruz depend largely on the scarcity of pack animals and the time of year, charges being higher during the rainy season, when parts of the road are in bad condition and traveling is slower. Rates vary between 45 and 60 bolivianos per mule for the trip, each mule carrying between 2 and 3 quintals, or from about 200 to 300 pounds. For burros the rates are somewhat less, taking into account their much smaller carrying capacity. The total length of the road is about 433 kilometers (269 miles). As it is the principal outlet for the city of Santa Cruz, a place of some 20,000 people, and for the surrounding district, there is a great deal of traffic over this road throughout the year. General merchandise is carried in one direction, and in the other hides and alcohol are the principal commodities carried. From the town of Aiquile a mule trail branches off to the east from the Cochabamba-Sucre road to Santa Cruz by way of Vallegrande, but there is comparatively little through travel over this road.

LOCAL ROADS OF EASTERN BOLIVIA.

In the Beni and Colonias regions roads have to be cut through the dense tropical forest for long distances, and during much of the year the plains, across which the roads are laid, are under water. Two of

the most important roads are that which connects the Mamore and the Beni, with terminals at, respectively, Exaltacion and Rurrenabaque, and that which connects Santa Ana with Riberalta. The former road leads slightly southwest by Santa Ana and Reyes across the plains of Mojos, and the other is used for driving cattle from the country south of the Yacuma to the rubber districts of Vaca Diez and Colonias. Another important road is that leading east from Riberalta to the river at Guayaramerin, opposite the terminus of the Madeira-Mamore Railway. A road, which has been used by automobiles during the dry season, has been run from Cobija on the Acre south to Porvenir, the head of navigation on the Tahuamanu, and thence to Carmen on the Madre de Dios. As this road crosses several rivers, the construction of some wooden bridges was necessary. Villa Bella and Manoa, at the mouth of the Abuna, are also connected by a road, which parallels the Madeira. There are also a number of long roads in the huge Province of Itenez in the Department of El Beni. These connect San Ramon on the Machupo with the important center of Magdalena on the Itonama and thence with the Rio Itenez. These roads link up with the system of roads in the eastern part of the Department of Santa Cruz that lead by San Ignacio and San Jose de Chiquitos to Puerto Suarez on the Paraguay River.

The Beni road from Santa Cruz goes as far north as Cuatro Ojos on the Pirai during the rainy season, and as far as Las Juntas or Puerto Velarde at the junction of the Pirai and Grande during the dry season. The distance from Santa Cruz to Cuatro Ojos is about 145 kilometers (90 miles), and thence to Puerto Velarde is another 60 kilometers (30 miles). In the wet season the road is very bad in the forest of Cuatro Ojos for a stretch of several leagues, and beyond that it is a veritable bog at this time of year. Cuatro Ojos and Puerto Velarde are, respectively, the limits of launch navigation on the Mamore system during the dry and the wet season. These launches ply down the Mamore by Trinidad to the terminus of the railway at Guayaramerin. Most of the traffic over the Beni road or "camino del Beni" is by means of mules and oxcarts.

One of the most famous routes in Bolivia is the old cart road between Santa Cruz and Puerto Suarez, which was laid out by Suarez Arana between 1874 and 1879 and which connects the interior of the Republic with the Paraguay River. This road, which is between 690 and 700 kilometers (430 and 435 miles) long, crosses the Rio Grande a few miles out of Santa Cruz and then disappears into the wilderness of the Monte Grande. For about 135 kilometers (84 miles) the road is a narrow "picada" or trail cut through the forest, with four "fortines" or pickets of soldiers at intervals of a day's ride. After leaving the Monte Grande the road skirts the marshy lake of Concepcion and then passes through San Jose, the capital of the Province of Chiquitos. Thence it leads in a general southeasterly direction, following the general trend of the Chiquitos hills, below Santiago and by the village of Santa Ana to Puerto Suarez on the Laguna de Caceres. From this body of water communication is had by a narrow channel with the Paraguay River. During most of the year the lagoon, though of vast extent, is too shallow to admit vessels of the draft of those plying between the River Plate and Corumbá. At such times it is only navigable for launches drawing

from 1 to 2 feet of water, and the channel is, moreover, often obstructed by great floating beds of weeds known as "camelotes." It is sometimes necessary to unload goods into oxcarts at Puerto Sucre, between Corumba and Puerto Suarez, for transportation to the latter point. For at least two months of the year, when the Paraguay is at its height, steamers which reach Corumba and which draw 5 or 6 feet of water could enter the Laguna de Caceres and discharge their cargo at Puerto Suarez. By the route used by the launches the distance between Puerto Suarez and Corumba is about 10 miles.

Long stretches of the road, especially across the low country between the last of the Chiquitos hills, at the Carmen ranch, and Puerto Suarez, are flooded during the rainy season and converted into almost impassable bogs. On the other hand, during the dry season, which is at its height in September and October, there is a serious scarcity of water over this section of the road. At this time travelers are dependent for water for themselves and their pack animals on the precarious supply which they may encounter in the water holes at intervals of many leagues along the road. Myriads of mosquitoes and "jejenes"—very small but extremely annoying insects—torment the traveler who makes this trip in the rainy season.

Traffic over this road is by means of mules, oxcarts, and bullocks. The Government mail carrier, who goes over this road regularly, rides a bullock. Mules, which are usually difficult to obtain, reach Santa Cruz in about three weeks from the river when the road is in good condition. Oxcarts drawn by five or six yoke of oxen make the distance in 35 to 40 days when the road is at its best, but after the annual rains have begun they may require from 6 to 10 months for the journey, being held up for weeks at a time by swamps and swollen rivers. In September, 1919, an American motor car, with its owner, the Bolivian "delegado" of the Territory of Oriente, and driven by an American mechanic, succeeded in reaching Santa Cruz from Puerto Suarez in 4 days and 16 hours of actual traveling, with an expenditure of 152 liters (40 gallons) of gasoline.

This road has lost much of its former importance as a route for the importation of foreign goods into Santa Cruz, and most of the merchandise sent out of Puerto Suarez is distributed among the towns of the intervening region, such as Santiago and San Jose, or diverted from the main road into the country to the north. One road branches off at San Jose and leads by San Rafael and San Ignacio across Velasco and Nuflo de Chavez into the basin of the Itenez. Another trail leads north from San Juan into the eastern part of Velasco, and a third goes around by Santo Corazon to the border at San Matias. A Belgian cattle and commercial company, the *Compañía Belga Sud-Americana*, has projected an automobile road from the Laguna de Gaiba to Santa Cruz. This would open up 400 kilometers (250 miles) of new road from the frontier to San Rafael in Velasco, and the road would have a total length of about 1,000 kilometers (620 miles). Though longer than the Puerto Suarez trail, the country through which it would pass is better suited for the building of good roads than is that traversed by the more southerly route. It is also declared that the steamers which ply to Corumba could reach the Laguna de Gaiba, which lies about 200 miles above.

The road from Santa Cruz into Argentina leads south and outside the last foothills of the Andes, to which it roughly runs parallel. After crossing the Rio Grande to the south of Santa Cruz the road forks, one branch leading slightly southwest by Lagunillas and the other around by Charagua and across the Parapiti, later converging and crossing the Pilcomayo at Puerto Montes or San Francisco. The road reaches the border at Yacuiba and continues thence to the terminus of the Argentine Central Northern Railway at Embarcacion, a distance of about 879 kilometers (546 miles) from Santa Cruz. Most of the traffic over this road is by means of mules, though oxcarts are also used for some classes of merchandise. At certain times of the year there is a lack of water over some of the southern stretches of the road and at other times the road is almost impassable as a result of heavy rains.

Tarija has road connections with Villazon over a bad trail, 240 kilometers (150 miles) long, with the Bermejo Valley to the south via Padeaya, and over a roundabout and little-used trail with Yacuiba. Still other trails go west over the mountains to Tupiza and northeast to Puerto Montes on the Pilcomayo.

LAKE AND RIVER NAVIGATION.

Lake Titicaca is the highest lake in the world navigated by steam vessels, being located at a height of 12,500 feet above the sea. It is navigated by the four steamers of the Lake Titicaca Navigation Co., a subsidiary of the Peruvian Corporation. These vessels, which are of 650 to 1,000 tons burden, were carried in sections by cart and mule over the mountains to the shores of the lake and there assembled. They are comfortably equipped for passenger traffic, and with good weather the voyage across the lake between Puno and Guaqui is a very enjoyable trip. These boats form a link in the through service between La Paz and Mollendo. One steamer a week stops at several points along the lake, while the alternate steamer makes the direct all-night run between Puno and Guaqui.

The traffic returns during 1917-18 and 1918-19 were as follows:

Items.	1917-18 ~		1918-19	
	Pounds sterling.	Dollars.	Pounds sterling.	Dollars.
Gross receipts.....	45,587	224,849	41,807	203,154
Operating expenses.....	27,704	134,822	28,651	139,430
Net receipts.....	17,883	87,027	13,156	64,024

The decrease in freight traffic amounted to 16,718 tons; 11,221 passengers were carried in 1917-18 and 12,262 in 1918-19.

The ordinary native craft used on Lake Titicaca consist of "balsas" or reed canoes, which are propelled by sails of the same material or by paddles.

Except for the Rio Desaguadero, on which small steamers can run, most of the navigable streams of Bolivia are found in the northwestern part of the Republic, where a number of great rivers flow into the

Amazon. There are thousands of miles of navigable rivers in this region. Not only are vast rivers like the Madre de Dios, Beni, Mamore, and Itenez navigable for much of their course, but small steamers can ascend many of their affluents for considerable distances. The principal navigable rivers, with their limits of launch navigation, are as follows (tributaries are indicated by indentions):

Rivers.	Limits.
Acre.....	Cobija.
Abuna.....	Santa Rosa.
Orton-Tahuamanu.....	Porvenir.
Madre de Dios.....	Puerto Maldonado.
Beni.....	Rurrenabaque (Puerto Salinas).
Mamore:	
Chapare.....	Todos Santos (Santa Rosa).
Chimore.....	Chimore.
Sara.....	Puerto Velarde (confluence of Pirai and Grande).
Pirai.....	Cuatro Ojos.
Grande.....	Higuerones.
Itenez.....	Matto Grosso (Brazil).
Itonama.....	San Pablo.
Baures.....	Baures.
Paragua.....	Florida.

The Madre de Dios is navigable for about 1,200 kilometers (750 miles), the Beni for nearly 1,000 kilometers (620 miles), the Mamore for about 1,300 kilometers (810 miles), and the Itenez for almost 1,700 kilometers (1,060 miles).

The principal obstacles to navigation in some of the Amazonian headwaters consist of bars and "palisadas" or snags. During the time of high water these streams eat away their banks on one side, with the result that large trees fall into the river and offer serious impediments to craft using the river. Light-draft snag boats, such as are used on some of our western rivers, are needed to clear the channels thus obstructed. The course of some of the rivers is also broken by dangerous "cachuelas" or rapids. The Madeira-Mamore Railway was built to avoid the series of terrible rapids of these two rivers. Before the construction of this line great numbers of boatmen were drowned and large quantities of rubber were lost from capsized "batelones" in attempts to run these rapids. Often the cargo was unloaded and portages effected around the rapids, causing a great loss of time, so that the return voyage between Riberalta and Porto Velho required several months to make. One of the most famous of these rapids is the Cachuela Esperanza in the Beni, a short distance above Villa Bella, and the Cachuela Fortaleza in the upper Abuna is another bad pass. At the Cachuela Esperanza the Beni is about 900 yards wide, and in a distance of about 300 yards the river has a fall of nearly 20 feet.

The navigability of these rivers also depends largely on the season of the year. Streams that can be used for steamers of relatively large draft during the rainy season and for some time after may only be passable for rowboats during the height of the dry season. This is particularly true of the Acre, by which steamers from Manaos can reach Cobija for several months of the year, but which is only open for "batelones" during much of the dry season. The difference in the amount of water between the two seasons is illustrated by conditions at Concepcion on the Beni, where the level of the river

varies from 8 feet in August to 25 feet in February. At Carmen on the Madre de Dios the level of water varies from 7 feet in August to a maximum of 30 feet in February, and at Porvenir on the Tahuamanu the difference is between 3 feet and 21 feet.

There are several types of boats used on these rivers, known as "balsas," "batelones," "callapos," "chalupas," "monterias," etc. The "balsa" is a kind of raft, made of a light wood known as "palo de balsa." It is usually about 25 feet long and 5 feet wide, and may have a capacity of as much as 800 pounds of cargo, exclusive of the rowers. "Balsas" are most commonly found on the Mapiri and the upper Beni. The "callapo" is made by lashing two or three "balsas" together, and will carry up to a ton and a half of cargo. The "chalupa" is a dugout canoe generally used by the Guarayos and Caripunas Indians. The "batelones" are the craft most widely used for transporting rubber over long distances. These boats may be 40 or 50 feet long by 10 feet wide, and have a capacity of several tons of cargo.

Most of the launches used on these rivers are of 10 to 50 tons burden. There are about 15 steamers of this class in service on the Mamore and its alluents. The tonnage of these boats varies from 10 to 120, but the majority of them are of 25 tons. Most of the launches on all these rivers are operated by the rubber companies, which not only use them to carry their rubber and merchandise but do a general freight and passenger business as common carriers. The launches are mostly wood burners and travel in a very leisurely manner, stopping wherever there is cargo to take on or disembark. The most important launch owners are Suarez Hermanos (Madre de Dios, Orton, Beni, and Mamore Rivers); Brailard & Co., (Beni, Mamore); Alfredo W. Barber & Co. (Beni, Mamore, Itenez); Zeller, Villinger & Co. (Mamore, Itenez); Madeira-Mamore Railway Co. (Mamore); Société Picollet (Abuna); Komarez & Bruckner (Itenez); Sociedad Comercial Matto Grosso y Bolivia (Itenez); and C. M. Barberv (Mamore). The Bolivian Government also operates a small fleet of launches, which not only are used for Government business but also operate as common carriers over certain stretches of the rivers. These launches are in charge of Sr. Benjamin Bowles, the son of an American long resident in Santa Cruz.

TELEGRAPHS.

The internal public telegraph system of Bolivia is controlled by the State, and is under the administration of the National Department of Posts and Telegraphs (*Dirección de Correos y Telégrafos*), a branch of the Ministry of Government or *Gobierno*. The national lines not only connect the principal centers of the plateau but furnish communications with such distant points as Santa Cruz, Tarija, and frontier points like Villazon and Yacuiba. The line from Cochabamba to Santa Cruz has been continued north to Cuatro Ojos at the junction of the Pirai and the Grande, and the line into Sucre reaches Padilla to the east. From this point there is a privately owned line through Lagunillas, which connects with the State line that runs north from Yacuiba through Villa Montes. Another line from La Paz connects the towns of the Yungas and has its other terminal at Cochabamba. All the important mining centers have telegraphic communications, and State lines follow most of the railways.

The Arica-La Paz, the Guaqui-La Paz, and the Bolivia Railway all have their own telegraph systems, which parallel their lines, and the same is true of the line operated by the Cía. Huanchaca de Bolivia. While these lines are primarily for the use of the companies which own them, the Government has the privilege of using their wires for sending official messages. Connections are had with Argentina and Chile over the State lines via, respectively, Tupiza and Uyuni.

The Bolivian Government now has wireless stations at Viacha, Trinidad (El Beni), Cobija (Colonias), Riberalta (El Beni), Villa Bella (El Beni), Yacuiba, and the three "fortines," or posts of D'Orbigny, Ballivian, and Esteros on the lower Pilcomayo. The Government's program provides for the installation of other stations at Apolo and Rurrenabaque in the upper Beni Basin, Cachuela Esperanza and Guayaramerin in the lower Beni region, Magdalena and Baures in the Itenez, Todos Santos on the Chapare, and Concepcion, San Ignacio, Santa Cruz, and Puerto Suarez in the Department of Santa Cruz. Connections may be had by the Riberalta station with the Brazilian system at Porto Velho. The central station of the Bolivian system is at Viacha near La Paz. Under certain conditions private messages may be sent by the Government wireless, but these stations are primarily intended to enable the Government to maintain communications with the distant and isolated parts of the country. At present telegraphic connections between La Paz and Puerto Suarez are by way of Buenos Aires and Sao Paulo.

The foreign telegraphic connections of Bolivia are over the All-America Cables (via Colon), which has acquired the old line from the coast formerly operated by the Cía. de Telégrafos a Bolivia (via Tacna), and over the West Coast of America Telegraph Co., a subsidiary of the Western Telegraph Co. (Ltd.). Messages sent by the former make connections with the main cable at Iquique, and those sent by the latter are routed via Guaqui, Mollendo, and thence south and across the Andes to the east-coast connections with the United States. The All-America Co.'s full rate from New York to La Paz is 50 cents a word, and half that for deferred messages.

MINING.

INTRODUCTORY SURVEY.

The mining industry forms the basis of the economic life of Bolivia to a degree unknown in any other South American Republic. On the plateau, which is the most highly developed part of the country, it dwarfs in importance all other industries. Most of the large centers of population are situated near mining districts or, as in the case of Oruro and Potosi, are themselves mining cities. In 1919, 87.88 per cent of the total exports of Bolivia consisted of minerals, amounting to a total value of 126,632,675 bolivianos. The duties collected from these exports amounted to 6,264,143 bolivianos.

The history of mining in Bolivia dates from the beginning of the colonial régime. During that period the mines of Potosi, Oruro, and Colquechaca, among others, were worked on a scale that gave large returns to the producers and to the Spanish Crown. However, in the last century of Spanish rule there was a marked decline in mineral production that continued through the troubled period of the Wars of Independence and well into the last century. The turbulence of those times and the falling price of silver were unfavorable to any revival of prosperity. However, the gradual establishment of a settled order in the country, the construction of railways, and the increased profitableness of the mining of tin and other base metals, as opposed to silver, gave the needed impulse that has resulted in the prosperous development of the past few decades.

The mineralized part of Bolivia comprises virtually the entire mountainous region of the plateau, from north of Lake Titicaca to the Argentine border. However, most of the mining development has taken place in the country to the east of the north-and-south railway from La Paz to Atocha. Though mineral resources of undoubted value exist in the Cordillera Occidental to the west of this line, the only mining district of actual importance in this region is that of Corocoro.

The Department of Potosi, in which the most highly worked part of the great mineral belt of Bolivia lies, contains the mining districts of Uncia and Llallagua (from which most of the Bolivian tin production is derived), Potosi, Porco, Colquechaca, Huanchaca, and the Aramayo-Francke and Oploca mines in the Chichas Provinces south-east of Uyuni. The Department of Oruro contains those of Morococala, Avicaya, Antequera, and the mines situated on the edge of the city of Oruro. In the Department of La Paz are the mines of Corocoro, Araca, Monte Blanco, Caracoles, and Milluni.

FACTORS AFFECTING THE MINING INDUSTRY.

TRANSPORTATION.

Foremost among the problems with which the mining industry of Bolivia has had to contend has been that of transportation. There are still some important mineral districts whose development is

impracticable because of the distance from a railway, and this condition was, of course, even more common before the advent of the lines that have linked up the plateau with the coast and furnished rail connections for rich mining districts. The mines of Oruro, Potosi, Huanchaca, Corocoro, Huanuni, Poopo, Porco, and Berenguela now have convenient railway outlets. The line from Machacamarca will soon reach the Uncia-Llallagua district, and it is planned later to extend it to Colquechaca. A spur of the Atocha branch of the Bolivia Railway is planned to run into the Chocaya mines, which are now only a few miles from the main line of the railroad. However, some of the other Aramayo-Francke and Oploca properties in the same region are still at a considerable distance from railway transportation. This is also the case with most of the mines of the Department of La Paz, especially in the high Inquisivi district. In order to solve the transportation problem of their Caracoles properties in this section, the Guggenheim interests are building an excellent automobile road from the Eucalyptus station of the Bolivia Railway to their mines. Mines which are located at some distance from a railway depend on oxcarts for bringing in machinery and other heavy equipment. This method is not only slow and cumbersome, but the heavier kinds of mining equipment can not be transported at all in this manner. Ores and concentrates are usually packed in sacks and sent out to the railway by pack trains. Llamas and burros are used for this work. Though the llama's carrying capacity is small—generally from 70 to 90 pounds—his original cost and his subsequent maintenance are comparatively small items. A llama train will make from 10 to 12 miles a day, the animals being allowed to graze at intervals along the way. For carrying ores over short distances by gravity, cableways or "andariveles" are used in a few mines, as in the Soux mines at Potosi and at the Patiño mines at Uncia.

LABOR

Most of the workmen employed in the mines are native "cholos" and Indians, as this has proved to be the only labor element adapted to the special conditions of the mining regions. The efficiency of labor imported from lower altitudes decreases greatly in the mines, some of which are located at 15,000 to 18,000 feet above sea level. The local supply of labor is limited, and, because of intemperate habits and the difficult conditions of life in that environment, the normal rate of increase can scarcely keep pace with the growing demands of the mining industry. Though slow, these men are in general as good miners as are to be found in South America. While a more capable worker, the Chilean "roto" is, as a rule, less steady and dependable than the Bolivian cholo. There have been few labor difficulties in the Bolivian mines, though there was a strike at Llallagua during 1919. Hours for mine labor vary from 9 to 11, and wages from 1 to 7 bolivianos a day, with the average near 3 bolivianos. The lower wages are paid to women and children, who are employed in some places at sorting ores. Some of them receive less than 1 boliviano a day for this class of work.

FUEL AND POWER.

As the water supply is short in some districts, these mining companies have been put to a great deal of trouble in obtaining sufficient water for their needs, for both their concentration and their power plants. The fuel problem has always been serious on the Bolivian plateau, and mining enterprises have utilized every local source of fuel that was available. These include "tola", a resinous shrub which grows on the table-land; "taquia," or llama dung; and "vareta," a large fungous, mossy-looking growth that has good fuel properties. However, the supply of all these is limited and is entirely insufficient for the needs of the mines. The price of coal is virtually prohibitive, but fuel oil is used for the Diesel engines, which are widely used. Consequently the mining companies tend to rely on hydroelectric power wherever possible, and some modern plants have been installed in connection with the larger mines, as at Llallagua. On the eastern slopes of the Andes there are generally, within reach of the mines, streams that can be made to serve for power purposes. Representatives of a large American electrical development company made an extensive survey of the power possibilities on the eastern side of the mountains in 1920, with a view to the establishment of electrical plants which could supply current for industrial enterprises of all kinds, including mines.

SMELTING.

Smelting has been little developed in Bolivia because of the high cost of fuel. For several years Luis Soux has operated a small smelter at Potosi, which produces the tin bars known as "Potosi bars." Using charcoal as fuel, this plant smelts tin ores in water-jacketed furnaces, the furnaces being connected by flues to boilers. The gases produced are used to raise steam in the boiler for remelting the tin in the refining plant. The tin comes from the furnace about 92 per cent pure, and the tin content is raised to 96 or 97 per cent by remelting. In 1914 some French capitalists studied the possibilities of erecting an electric smelter, which would receive its power from a large hydroelectric installation. However, this project was cut short by the war. The next year American interests made proposals to the Bolivian Government to install a system of electric smelters in the country. They suggested that an export tax be put on tin concentrates that would force all tin ores to be sent to the company's smelters. The Government was asked to grant exclusive rights for 25 years, it to receive 10 per cent of the amounts paid by the mining companies for smelting their ores. Two rival concerns were interested in this smelter project, and considerable discussion was aroused in mining circles in Bolivia—much of it hostile to the project because of its monopoly character. An experiment was made with an electric smelter at La Paz by the so-called Andes Tin Smelting Co., but it proved unsuccessful, and with its failure the movement for electric smelters ended. However, the Llallagua company put up a smelter at Arica through a subsidiary concern known as the *Compañía Chilena de Fundición de Estaño*, which was capitalized at £50,000 (\$243,325). This is a small reverberatory smelter, which uses petroleum residue and anthracite as fuel. Though part of its early product assayed at only 99 per cent tin,

it has produced some with a tin content of 99.84 per cent. However, the plant has not proved a success, and its operation has been suspended.

Bolivian ores are generally complex, and often demand special treatment in smelting. An intimate relation exists between tin, silver, bismuth, and tungsten ores, and the ores are sometimes further complicated by the presence of antimony, lead, or copper. Silver and tin are often found in the same vein, as at Oruro and Potosi. It is this circumstance that makes it difficult to divide the country into districts on the basis of any predominant metaliferous ores. Before 1890 such ores were usually worked for their silver alone, but since that time attention has mainly been given to their tin content.

Ores are shipped as "barrilla" or concentrate after treatment in the "ingenios" or reduction plants operated by the mining companies. The tin content of the barrilla exported from Bolivia varies from 60 to 70 per cent, but the bulk of the export runs 66 or 67 per cent tin. The final smelting is done in Europe or the United States. Formerly all the concentrates went to England and Germany, but two smelters erected in the United States since 1915 are taking an increasing proportion of the Bolivian exports. The American Smelting & Refining Co. began the erection of a smelter at Perth Amboy, N. J., in March, 1915, and in 1917 increased its capacity to 1,500 tons a month. Ninety-nine per cent tin is produced in the furnaces, and this is refined by an electrolytic process to 99.90 per cent and even better. This is higher than the average content of the Straits tin, which sets the standard in the world's tin market. The Williams Harvey Corporation, which is controlled by the Williams Harvey Co., of Liverpool, the National Lead Co., and Simon Patiño, the Bolivian tin magnate, has since erected another smelter on Long Island.

DUTIES.

Another factor which closely concerns the mining business is the duties that are levied on the production and exportation of minerals by the Bolivian Government. On February 26, 1920, a graduated tax on mineral production was promulgated by the President of the Republic. Article 1 states that the profits obtained by mining enterprises in general, whatever the form in which they are organized, will be subject to the payment of the following taxes:

From the total of the net profits there will be deducted a sum amounting to 10 per cent of the capital stock. This 10 per cent will be free from taxation. After this sum has been deducted, the amount of the profits will be taxed according to the following scale:

Percentage of profits.	Percentage of tax.	Percentage of profits.	Percentage of tax.	Percentage of profits.	Percentage of tax.
1 to 15.	8	95 to 115.	13	215 to 245.	21
15 to 35.	9	115 to 135.	14	245 to 275.	23
35 to 55.	10	135 to 155.	15	275 to 305.	25
55 to 75.	11	155 to 185.	17	305 and over.	30
75 to 95.	12	185 to 215.	19		

All enterprises whose profits do not amount to 20,000 bolivianos a year are exempted from the payment of this tax.

Other articles included in the law define the usage of the term "capital," limit the total of salaries and bonuses to employees to 20 per cent of the production, and state that stores conducted by the mining companies or the rents which they produce shall be considered as an integral part of the mining business. The President of the Republic is empowered to order such investigations as he may consider necessary in order to insure the veracity and exactness of the balances of the companies.

To the end of May of the same year the Government had collected a total of 1,927,590 bolivianos from four companies; 1,867,412 bolivianos of this was paid by the Llallagua company.¹

On February 20, 1920, the Bolivian Government established an export duty on silver. The principal provisions of the supreme decree of that date were as follows:

1. From March 3 the customhouses of the Republic will collect a duty on the exportation of silver, taking as basis the kilogram of pure silver, in whatever form it may be exported. The commercial quotations of the market value of silver will serve as basis for assessing the duty.

(a) If the quotation of the standard troy ounce in the London market does not exceed 20 pence, each kilogram of silver exported shall pay 4 centavos.

(b) If the quotation exceeds 20 pence, but does not exceed 40 pence, the duty will be increased at the rate of 4 centavos per kilogram for each penny of excess.

(c) If the quotation exceeds 40 pence, there shall be added to the former rates 8 centavos per kilogram for each penny of the additional excess. Fractions of the penny are not to be considered in levying the duty.

2. In case the New York quotations predominate in the silver market, the equivalent of the former quotation will be determined in American money on the basis of the par exchange with English money.

3. Worked silver or old plate shall pay, whatever the percentage of silver in it, at the rate of 8 bolivianos per kilogram. (Silver articles of artistic or historical value can not be exported, according to law of Oct. 3, 1906.)

4. Exporters shall declare in the invoice of exportation the percentage of silver in the ore exported, and on this provisional basis the export duties shall be levied. The final settlement of the duties will be decided by assay of the ore or by the bills of sale of the product exported.

5. (Provides for the method of making the assay in the office of internal revenues.)

6. If the result of the assay show a difference against the interests of the treasury, there shall be levied double the duty of which the Government would have been defrauded.

7. Bills of sale are to be presented at the customhouse within 180 days, for the purpose of verifying the invoices of exportation.

8. In case the assay should prove the quantity of metal to be less than as specified in the invoice, the difference in duties will not be returned to the exporter.

The schedules of export duties levied on tin, copper, wolfram, antimony, and bismuth are found on pages 7-53 of the publication entitled "*Arancel de Derechos de Exportación*," which may be consulted at the Bureau of Foreign and Domestic Commerce, in Washington, or purchased from any of the La Paz book stores for the sum of 10 bolivianos, in addition to 1 bolíviano to cover cost of postage.

¹ EDITOR'S NOTE.—In Commerce Reports for Apr. 1, 1921, the following note appeared: "Several new laws have been proposed to take the place of the law recently passed by the Junta raising the Bolivian tax on oil and mineral concessions to 50 centavos per hectare. The law which is in force at present increased the tax on land held under petroleum, coal, sulphur, and lignite concessions from 8 centavos (about 3 cents) to 50 centavos (about 18 cents). This tax, according to the law, is due every six months. Of the amount derived from this increased mineral taxation, 30 per cent is to be used in the construction of the railway from Potosí to Sucre, 30 per cent for the railway from Cochabamba to Santa Cruz, and the remaining 40 per cent is to be paid into the national treasury. Information relative to the adoption of any of the new proposed laws will be published in Commerce Reports as it is received."

MINING LAW.

The following extract from a report by Consul Hazeltine, formerly at La Paz, contains the essential facts of Bolivian mining law:

There is probably no country in the world where the mining laws in general are more favorable to the foreigner than in Bolivia. All foreigners, regardless of nationality, may acquire mineral claims under exactly the same conditions as citizens of Bolivia. Nor are these conditions onerous or difficult of fulfillment. Moreover, all machinery for mineral or agricultural uses is admitted duty free, and the exportation of mineral ores is free, with the exception of tin, copper, silver, gold, bismuth, and tungsten, which are subject to a comparatively light export duty herein set forth.

Any individual, foreigner or national, may acquire one or more claims in known minerals, and in recently discovered minerals he may acquire 30 claims if the deposits are metalliferous, and if they are not metalliferous he may obtain 74 claims. The claim, or unit of measure for mineral concessions, is a square of 100 meters measured horizontally—that is 10,000 square meters. Any person may freely prospect on public lands without a license, but is obliged to notify the local administrative authorities. A concession of one or more claims must be applied for before the prefect or delegate of the Department in which the claim is situated. The application must be presented on stamped paper to the value of 20 bolivianos, and the semiannual payments are 2 bolivianos for each claim if the mine is a vein and 1 boliviano per claim if placer or lode.

The application must state:

- (1) Name, residence, and occupation of applicant.
- (2) Name of the proposed concession.
- (3) Definite outlines of the claims.
- (4) Number of claims.
- (5) Name of the mining district, if any.
- (6) Names of adjacent mines and relative position.
- (7) If private lands, the name of the owner.

The plans must show astronomical and magnetic bearings, and the claims outlined in perfect squares of 1 hectare each, and the whole plan on a scale of 1 to 2,000.

The method of exploitation is completely free, and the employees of mines are obliged to obey the laws of the mining police with especial care for the life and health of the laborers, public tranquillity, and the safety of neighboring mines.

No restrictions, legislative or administrative, are placed on aliens and not on nationals in granting mining rights or concessions.

No restrictions, legislative or administrative, are placed on aliens and not on nationals in operating mineral properties or distributing mineral products.

There are no restrictions, either legislative or administrative, on the sale of mining rights and properties to aliens.

All mineral rights are commonly reserved to the Government by law dated October 13, 1880, and the procedure necessary to enable a person to explore or develop mineral resources is set forth above.

There is no discrimination against foreigners in any respect whatsoever.

No development of mineral resources or distribution of mineral products is effected directly by the Government.

The Government does not finance any private companies engaged in producing or distributing mineral products.

TIN.

The tin-mining industry in Bolivia is of very recent development, dating from about 1895, when the decreased production of silver from some of the Potosi mines diverted the attention of some of the mining interests of that place to the possibilities of tin mining. Tin is now the most important mineral product of Bolivia, having supplanted silver for first place. In 1905 Bolivia took second place from Banka and Billiton, and has since ranked next to the Straits Settlements as a producer of tin. Though the industry received a temporary setback from the allied restrictions on imports during part of the war period, it quickly recovered when the market was thrown open again.

The tin-mining belt of Bolivia extends from a little north of the latitude of La Paz south almost to the Argentine border. The northernmost deposits worked at present are those of Milluni and Huayna Potosi and the southernmost are those of Chocaya. The principal tin fields are situated in the Cordillera de las Tres Cruces or Quimsa Cruz in the Inquisivi district of the Department of La Paz, in a long narrow triangle formed by Oruro, Avicaya, and Uncia, in the vicinity of the city of Potosi, and in the Province of Sur Chichas in the Department of Potosi. There are also a few minor isolated fields, like that of Berenguela in the Department of Cochabamba. In the first zone are located the mines of Araea, Caracoles, Colquiri, and Monte Blanco; in the second are those of Oruro, Morocacala, Huanuni, Avicaya, Antequera, and the enormously rich mines of Uncia and Llallagua; in the third district are situated the mines of the Cerro of Potosi and of Poreo; and in Sur Chichas are found the mines of the Aramayo-Francke and Oploca companies at Chocaya and Chorolque.

In distinction from the alluvial deposits of the Straits Settlements, Bolivian tin is largely extracted from lodes. Tin placers are now little used, though some washings are worked near Oruro and Potosi. The richest ores generally run from 6 to 8 per cent tin. Ore that is rich enough to ship or that can be hand sorted is known as "guia." However, the bulk of the ore is too poor in tin to be handled in this way and is subjected to mechanical concentration to yield a concentrate or "barrilla" containing from 55 to 70 per cent tin. The commonest ores are the dioxide, accompanied with peroxide of iron, and cassiterite (stannic oxide). The cassiterite is generally found with pyrites, iron hydroxide, silver ores or with native silver, antimony, or wolframite. At Potosi it is found in company with the yellow oxide of antimony. The tin-mining methods used are still very defective and in some places quite crude, in spite of marked improvements in some of the larger plants, as in those of Patiño and Llallagua. Too little effort has been made to work the veins with regard to their future productivity, but the aim has usually been to secure the largest possible returns in the quickest time. Also, there is still a considerable loss in the tailings in concentrating operations.

The progress of tin mining is illustrated by the following statistics of exports of "barrilla" and bars for the years 1897-1918:

Years.	Quantity.	Years.	Quantity.	Value.
	<i>Metric tons.</i>		<i>Metric tons.</i>	<i>Bolivianos.</i>
1897.....	3,749	1908.....	32,542	30,925,803
1898.....	4,396	1909.....	35,366	31,651,210
1899.....	9,279	1910.....	38,548	37,006,501
1900.....	16,234	1911.....	39,841	52,639,603
1901.....	21,916	1912.....	38,614	60,238,197
1902.....	17,608	1913.....	41,591	67,784,378
1903.....	28,131	1914.....	39,260	42,479,838
1904.....	20,692	1915.....	36,492	44,885,450
1905.....	26,912	1916.....	33,543	42,632,259
1906.....	39,526	1917.....	46,956	81,366,953
1907.....	31,324	1918.....	48,801	129,611,140

In 1918 tin accounted for 71 per cent of the value of all Bolivian exports. The export duties levied on tin amounted in 1918 to 7,380,653 bolivianos, or 89.50 per cent of all export duties collected during the year.

The source of the tin exports of 1918, according to Departments where produced, was as follows:

Departments.	Kilos.	Bolivianos.
Potosi.....	39,292,646	102,881,522
Oruro.....	7,687,486	21,986,605
La Paz.....	1,528,517	3,950,633
Cochabamba.....	292,378	810,380
Total.....	48,801,027	129,629,140

The proportion of tin exported by some of the more important producers during the period 1912-1919 was as follows:

Producers.	1912		1913		1914	
	Kilos.	Percent- age.	Kilos.	Percent- age.	Kilos.	Percent- age.
Patiño.....	13,946,600	36.13	16,005,986	35.90	10,763,385	28.91
Llallagua.....	3,312,085	8.57	5,771,633	12.95	4,840,232	13.00
Cía. Minera de Oruro.....	128,473	.32			191,212	.51
Empresa Consolidada Colquechaca.....	322,422	.84	337,936	.75	315,712	.84
Monte Blanco.....	233,354	.61	541,700	1.21	594,388	1.59
Huayna Potosi y Milluni.....	4,156,616	10.76	3,673,051	8.23	680,174	1.82
Aramayo-Francke.....					1,514,516	4.06
Soux.....	16,514,755	42.77	18,264,443	40.96	18,359,938	49.27
Others.....						
Total.....	38,614,305	100.00	44,594,749	100.00	37,259,617	100.00

Producers.	1915		1916		1917		1918	
	Kilos.	Per- centage.	Kilos.	Per- centage.	Kilos.	Per- centage.	Kilos.	Per- centage.
Patiño.....	10,112,553	27.72	10,369,924	29.17	13,643,231	29.39	11,615,430	23.81
Llallagua.....	5,811,944	15.93	7,187,094	20.22	12,161,096	26.18	17,962,371	36.82
Oruro.....	1,156,339	3.16	1,069,280	3.01	1,116,492	2.40	1,099,547	2.25
Colquechaca.....	252,169	.69	257,634	.75	689,554	1.48	395,630	.81
Monte Blanco.....	292,576	.80	279,435	.78	349,062	.75	311,915	.63
Huayna Potosi.....	317,361	.86	248,930	.70	216,688	.47	111,270	.23
Aramayo-Francke.....	1,209,840	3.31	3,430,701	9.65	4,128,808	8.91	4,148,308	8.49
Soux.....	2,376,152	6.52	1,616,990	4.51	1,363,064	2.93	906,761	1.86
Others.....	14,963,201	41.01	11,083,561	31.18	12,759,119	27.49	12,246,795	25.10
Total.....	36,492,135	100.00	35,543,549	100.00	46,427,114	100.00	48,801,027	100.00

As this table shows, the combined production of the Patiño and Llallagua mines in 1917 was 66.57 per cent, or nearly two-thirds, that of the entire country, and in 1918 the proportion was 60.63 per cent. Part of the production grouped here as "Others" is accounted for by such mines as Avicaya, Areca, Morocacala, and Bebins' mines in the Cerro at Potosi; the remainder is derived from the output of small miners, many of them Indians, who sell their ore to "habilitadores" or grubstakers, who advance them money for their operations.

Exports by countries of destination in 1918 were as follows:

Countries.	Kilos.	Bolivianos.
Great Britain.....	27,303,086	73,938,292
United States.....	18,189,419	46,381,588
Other countries.....	3,308,522	9,291,260
Total.....	48,801,027	129,611,140

Great Britain took 56 per cent of the total output of this year, as against 37 per cent for the United States and 7 per cent for other countries, including France and Chile. In 1915 Great Britain took about 96.9 per cent of the Bolivian production and the United States only 3 per cent. Exports to these two countries during the period 1912-1918 were as follows:

Years.	Great Britain.		United States.	
	Kilos.	Bolivianos.	Kilos.	Bolivianos.
1912.....	36,618,841	57,125,569	8,286	12,910
1913.....	42,282,858	61,270,305	.....	.....
1914.....	35,957,134	40,991,006	20,782	23,691
1915.....	35,358,132	43,490,505	1,101,836	1,355,257
1916.....	32,569,151	39,082,981	2,884,370	3,461,244
1917.....	31,157,050	57,990,001	14,926,047	26,751,785
1918.....	27,303,086	73,938,292	18,189,419	46,381,588

This great increase in shipments of tin concentrates to the United States is largely due to the erection of the two smelters since 1915, as previous to that time this country was only able to take Bolivian tin bars. In 1919 the British chargé d'affaires in La Paz wrote as follows: "Since the United States embargo was raised on June 8, the Bolivian output has practically all sought a market in America."

In 1919 exports of tin were as follows:

	Kilos.	Bolivianos.
Concentrate.....	18,211,287	99,271,451
Bars.....	287,896	652,603
Total.....	18,499,183	99,924,054

The Government collected in export taxes on tin the sum of 5,951,-206 bolivianos, or 89 per cent of the total export taxes collected. Tin exports represented 69 per cent of the total value of the national

exports for the year. The destination of the "barrilla" shipped was as follows:

Countries.	Kilos.	Value.	
		Bolivianos.	Percentage.
Great Britain.....	26,883,279	54,789,225	55.20
United States.....	19,852,596	41,519,062	41.83
Chile.....	1,092,382	2,181,143	2.19
France.....	383,060	782,020	.78

About 90 per cent of the total export of bars was shipped to England.

SILVER.

Silver long constituted the basis of Bolivia's mining industry, and remained such until it was superseded by tin. The wide adoption of monometalism among the leading industrial nations, the development of other silver fields, as in Australia and Colorado, the general fall in the price of silver, and the lack of capital to put the mines on a modern basis of operation—these were the principal factors that brought about the decline of the Bolivian industry. Scores of mines that had been worked since colonial times were abandoned or began to be worked for other metals. Even to-day, when the industry has begun to revive under the impulse of the higher prices, silver, wherever it is produced (save in a very few cases), is secondary to some other metal found in combination with it.

The silver deposits of Bolivia extend from the southern part of the Department of La Paz south into the Sur Chichas country, which lies below the latitude of Uyuni. Silver is found well to the east of the main range of the Cordillera Real in the Departments of Cochabamba and Chuquisaca and to the west across the table-land in the Cordillera Occidental, whose ranges reach out into the Province of Carangas. Above all it is found in the Department of Potosi, whose very name is as closely associated with the history of silver mining as are those of Guanajuato and San Luis Potosi in Mexico. The principal centers of the industry are the cities of Oruro and Potosi, and the mines of Huanchaca-Pulacayo near Uyuni. Other mining centers are Huanuni, Chocaya, and Colquechaca, long abandoned but now reopened. Among the abandoned mining districts of southern Bolivia are those of Andacaba, San Cristobal de Lipez, and Portu-galete, now the property of the Oploca company.

The argentiferous ores of Bolivia generally exist in the form of sulphides or as high-grade protochlorides, and usually in close association with tin oxides, or with antimony or zinc. Ores which hold a very high silver content are known as "rosicler." In the treatment of composite ores the silver is commonly recovered by a process of lixiviation with hyposulphite or brine, after the ore has been submitted to a chlorodizing roast, the metal being precipitated from the solution as the sulphide or silver cement, in which form it is shipped. Higher-grade, hand-sorted ores are also exported without being treated before shipment.

Exports of silver during the period 1908-1918 were as follows, the figures given referring to actual silver content of ores and not to their gross weight:

Years.	Kilos.	Bolivianos.	Years.	Kilos.	Bolivianos.
1908.....	156,482	8,058,092	1911.....	72,336	2,531,329
1909.....	157,844	5,721,915	1915.....	82,459	2,982,859
1910.....	112,939	5,261,411	1916.....	106,098	4,493,611
1911.....	127,900	4,587,716	1917.....	119,160	5,693,639
1912.....	123,939	4,308,329	1918.....	100,272	7,491,421
1913.....	81,289	2,781,355	1919.....	.....	12,349,384

Classified exports of silver in 1918 were as follows:

Classes.	Gross weight.	Silver content.
	<i>Kilos.</i>	<i>Kilos.</i>
Ores.....	12,637,311	42,315
Sulphides.....	120,965	46,162
Cements.....	156,902	11,784
"Piña" ¹	309	11
Coin.....	4,897	.....
Total.....	12,920,414	100,272

¹ Virgin silver treated with mercury.

COPPER.

Though the cupriferous deposits of Bolivia are widely distributed in both of the main Andean chains, mining is largely confined to the Corocoro district in the Province of Pacajes of the Department of La Paz. The deposits in this region are a continuation of those of the Chuquicamata field in northern Chile, copper being found in the intervening country at Cobrizos and in the Carangas district in the remote ranges of the western part of the Department of Oruro. The same series of ore beds crop out again in the rich Cerro de Pasco and Moracocha fields in Peru. Copper also occurs at intervals in a belt which extends north from Corocoro across the Provinces of Omasuyos and Muncas into Caupolican. It is also found in several localities in the neighborhood of Oruro and in the Porco and Chayanta sections of the Department of Potosi, where it is a prominent by-product in some mining operations. Ores of high copper content have been found in the Department of Chuquisaca to the southeast of Sucre, but these deposits are located too far from the railway for their exploitation to be practicable. The importance of Corocoro is due not only to its superior transportation facilities, afforded by the Tarajra spur of the Arica Railway, but to the presence in that locality of large amounts of pure copper, as in the Lake Superior region of the United States. Native copper occurs there in the form of powder or in plates or nodules in vast beds of reddish sandstone. Larger masses, known as "charquis," are also frequently encountered.

Exports of copper for the years 1908-1919 were as follows:

Years.	Kilos.	Bolivianos.	Years.	Kilos.	Bolivianos.
1908.....	2,877,605	1,181,173	1911.....	8,667,438	1,142,735
1909.....	3,131,011	1,651,787	1915.....	23,812,798	11,035,311
1910.....	3,206,999	1,788,092	1916.....	29,011,121	8,851,521
1911.....	2,950,023	1,129,913	1917.....	37,111,900	11,921,118
1912.....	1,707,188	3,389,176	1918.....	26,000,381	7,716,313
1913.....	5,060,372	3,286,715	1919.....	22,970,425	5,316,671

Exports during the first half of 1919 amounted to 9,200,369 kilos. In 1914 the 25 per cent export duty on nonconcentrated copper ores was withdrawn, as a result of which exports in 1915 were almost treble those in 1914. The opening of the Arica-La Paz Railway also had its effect on the increased production at Corocoro during this period.

Copper exports in 1918, according to classes, were as follows:

Classes.	Gross weight.	Percentage of copper.	Value.
	<i>Kilos.</i>		<i>Bolivianos.</i>
Unconcentrated ores.....	19,896,837	22	4,155,800
Concentrates.....	3,935,295	83	2,955,327
Sulphide concentrates.....	1,900,000	60	429,913
Cements.....	131,882	60	104,682
Copper matte.....	133,350	60	100,601
Bars.....	17	90	20
Total.....	26,000,381		7,746,343

Of the total volume of exports for 1918, 24,945,049 kilos were sent to the United States, 883,998 kilos to Great Britain, and 171,334 kilos to Chile.

Production by Departments during the period from 1912 to June 30, 1919, was as follows:

Years.	La Paz.	Oruro.	Potosi.	Cochabamba.	Total.
	<i>Kilos.</i>	<i>Kilos.</i>	<i>Kilos.</i>	<i>Kilos.</i>	<i>Kilos.</i>
1912.....	5,372,985	20,470	61,924		5,455,379
1913.....	1,476,142	85,598	198,632		5,060,372
1914.....	8,380,572	85,975	200,891		8,667,438
1915.....	23,278,572	379,843	154,802		23,812,798
1916.....	28,210,842	239,195	461,087		29,011,124
1917.....	36,194,765	687,322	543,199	19,614	37,444,900
1918.....	25,416,299	157,847	427,035		26,000,379
1919 (6 months).....	8,960,795	96,543	143,031		9,200,369
Total.....	410,290,972	1,752,793	2,490,601	19,614	144,652,759

LEAD.

There has been a steady increase in exports of lead during the past few years, as is shown by the following table:

Years.	Kilos.	Bolivianos.	Years.	Kilos.	Bolivianos.
1908.....	5,150	982	1914.....	1,554,570	155,457
1909.....	6,000	250	1915.....	2,216,388	354,535
1910.....	30,485	700	1916.....	2,420,950	477,156
1911.....	343,188	23,546	1917.....	4,129,288	1,520,104
1912.....	1,074,887	214,977	1918.....	4,606,851	1,803,041
1913.....	1,765,296	353,059	1919.....	4,759,295	1,815,840

These include both lead ores and the metal, small quantities of the pure lead being exported. The Bolivian industry can be maintained in competition with that of the United States, Spain, Germany, and Australia only during the continuance of such prices as prevailed during the period 1913-1918 (£21 to £40 per ton).

Most of the lead exported from Bolivia is produced in the Province of Sur Chichas and near the Argentine border, and is sent out through La Quiaca. The production of lead ores by districts during 1918 was as follows:

Department of Potosi:		Kilos.
Province of Sur Chichas.....	{ bars... ores... }	17, 419
		4, 549, 000
Department of La Paz:		
Province of Ingavi.....	do....	25, 250
Province of Murillo.....	do....	15, 182
Total.....		4, 606, 851

The destination of the exports in 1918 was as follows:

Countries.	Kilos.	Bolivianos.
Great Britain.....	4, 339, 601	1, 702, 611
Argentina.....	242, 000	90, 803
United States.....	25, 250	9, 627
Total.....	4, 606, 851	1, 803, 011

ANTIMONY.

The mining of antimony in Bolivia, which in ordinary times is of little consequence, received a great impulse during the war, but after the cessation of the extraordinary war demand the industry quickly returned to its prewar status. The course of antimony exports is illustrated by the following table for the years from 1908 to June, 1919:

Years.	Kilos.	Bolivianos.	Years.	Kilos.	Bolivianos.
1908.....	919, 735	105, 147	1914.....	186, 077	30, 617
1909.....	511, 440	51, 634	1915.....	17, 923, 048	13, 442, 286
1910.....	524, 878	97, 080	1916.....	27, 413, 715	16, 996, 503
1911.....	311, 715	68, 419	1917.....	23, 381, 392	17, 017, 907
1912.....	91, 350	22, 837	1918.....	6, 836, 068	4, 155, 322
1913.....	62, 050	12, 410	1919 (6 months).....	76, 800	30, 720

The fluctuations in the price of antimony during the war are illustrated by the following figures, prices being given in cents per pound:

Years.	Lowest.		Highest.		Average.
	Cents.	Month.	Cents.	Month.	
1915.....	15.85	January.....	39.25	December.....	30.28
1916.....	11.53	August.....	44.75	March.....	25.37
1917.....	13.91	November.....	34.04	April.....	20.69
1918.....	8.77	do.....	11.28	January.....	12.58

Exports according to countries of destination in 1918 were as follows:

Countries.	Kilos.	Bolivianos.
Great Britain.....	6,313,413	3,658,342
United States.....	357,430	382,450
Chile.....	152,892	101,665
Argentina.....	9,287	9,682
Brazil.....	3,046	3,185
Total.....	6,836,068	4,155,323

Antimony is found in the same general localities in which tin ores occur. The principal producing districts during the war boom were the Chuqitu section near Uncia, the country about Porco, and that part of southern Bolivia which finds its outlets by way of Atocha and Uyuni to the north and by La Quiaca into the Argentine. Large shipments were made through Challapata on the railway between Uyuni and Oruro. Among the largest shippers of southern Bolivia were Ricardo Cruz, of Uyuni, and the Aramayo-Francke mines.

The most common ores are sulphides. The ores are usually abundant and rich, with wide veins, which often run 70 per cent pure metal. Many of the mines operated during the war were small, crudely worked properties in the hands of Indians, whose operations were financed by the purchasers of the ores.

TUNGSTEN.

The remarkable development of tungsten or wolfram production between 1915 and 1918 was also the result of the unusual demand for it which was created by the war for use in connection with the manufacture of steel. During the 10-year period 1909-1918 exports increased as follows:

Years.	Kilos.	Bolivianos.	Years.	Kilos.	Bolivianos.
1909.....	152,600	97,692	1914.....	276,316	428,300
1910.....	210,061	141,629	1915.....	792,511	1,497,846
1911.....	297,272	231,188	1916.....	3,035,134	5,675,701
1912.....	474,540	519,705	1917.....	3,890,534	10,810,292
1913.....	282,597	415,418	1918.....	3,418,316	10,591,429

NOTE.—In 1919 exports fell to 1,994,769 kilos.

Exports of wolfram concentrates according to countries of destination in 1917 and 1918 were as follows:

Countries.	1917		1918		
	Kilos.	Bolivianos.	Kilos.	Bolivianos.	Percentage.
United States.....	1,934,057	6,392,927	2,539,213	7,983,355	75.38
Great Britain.....	1,398,325	3,248,161	554,432	1,627,612	15.36
France.....	545,625	1,136,148	321,096	973,424	9.19
Chile.....	10,344	28,963	3,575	7,038	.07
Peru.....	2,183	4,093			
Total.....	3,890,534	10,810,292	3,418,316	10,591,429	

The areas of largest production during the period of the war boom were the three Provinces of Sur Yungas, Inquisivi, and Murillo in the Department of La Paz, the Province of Cercado in Oruro, the Province of Ayopaya in Cochabamba, and Nor Chichas in Potosí. In 1917 the first three Provinces produced, respectively, 728,953, 455,534, and 640,476 kilos of "barrilla," and the Province of Cercado produced 1,501,849 kilos in the same year. The heaviest producers in the Province of Sur Yungas were the El Carmen, La Chojlla, Maria de la Luz, La Andina, and Enramada mines, the first two of which were properties of the International Mining Co. In Inquisivi the heaviest producers were the La Aguada, Chicote, Huanchaca, Amutara, and Paconi properties, and in Cercado the districts of San Antonio, Pongo, and Condeauqui. The Pongo district produced 695,171 kilos in 1917, which constituted the record for the country. The most important interest in this field and in that of San Antonio was that of Rafael Taborga, whose ores obtained a prime reputation in the United States for their high grade. Patiño's Kami mines were the largest producers in Cochabamba, as the Aramayo-Francke properties at Sala Sala were in Nor Chichas.

BISMUTH.

Exports of bismuth during the period 1908-1917 were as follows:

Years.	Kilos.	Bolivianos.	Years.	Kilos.	Bolivianos.
1908.....	160,304	352,500	1913.....	422,664	2,092,926
1909.....	256,762	1,465,315	1914.....	549,669	2,802,278
1910.....	262,728	1,966,595	1915.....	662,565	3,670,451
1911.....	555,237	2,218,051	1916.....	668,426	3,154,905
1912.....	477,748	2,150,042	1917.....	531,717	4,116,678

Classified exports of bismuth in 1918 were as follows:

Form in which exported.	Kilos.	Bolivianos.	Form in which exported.	Kilos.	Bolivianos.
Bars.....	218,982	3,144,372	Unconcentrated ores.....	111,523	415,221
Concentrates ("barrilla")...	75,569	612,901	Total.....	590,072	4,403,327
Residues.....	53,998	230,745			

With the exception of 1,210 kilos of bars exported to France and the United States, the entire bismuth production of 1918 was shipped to Great Britain. Between December, 1914, and July, 1919, the price of bismuth on the London market rose from 7s. 6d. (\$1.82) to 12s. 6d. (\$3.04) per pound. Exports in 1919 amounted to 374,076 kilos, valued at 490,072 bolivianos.

The production of this mineral has been almost exclusively in the hands of the Aramayo-Francke Mines, whose bismuth-producing mines are located in the Sur Chichas district of the Department of Potosí at Tasna and Chorolque. This British company has smelters at Buen Retiro and Quechisla for the making of bismuth bars. Their product is exported over the Atocha branch of the Bolivia Railway and thence through Uyuni and Antofagasta. Bismuth is also mined in small quantities in other parts of the Department of

Potosi, as at the Real Socavon mine in the Cerro of Potosi, at Colquechaca, in the Provinces of Porco and Charcas, at Esmoraca in Sur Chichas, and at Patiño's Salvadora mine at Uncia. In the Department of La Paz it is found in the vicinity of Milluni and Huayna Potosi. The latest development in the industry is the exploitation of bismuth deposits in the Uncia-Llallagua district, which is the center of the Bolivian tin industry.

Most of the ores worked at Tasna and Chorolque are sulphides, which run from 10 to 15 per cent bismuth. Crystals of native bismuth are found in the Huayna Potosi district. The mineral is used, largely in the form of the subnitrate, in the manufacture of certain medicines. It is also used as a component of certain alloys with lead and tin.

ZINC.

Exports of zinc for the years 1908-1918 were as follos:

Years.	Kilos.	Bolivianos.	Years.	Kilos.	Bolivianos.
1908.....	1,212	342	1914.....	3,755,450	140,623
1909.....	302,000	13,162	1915.....	104,249	18,560
1910.....	11,797,000	435,009	1916.....	482,876	236,609
1911.....	9,798,125	372,490	1917.....	427,047	530,780
1912.....	8,961,352	329,995	1918.....	4,186	2,680
1913.....	7,367,463	223,150			

The Compañía Huanchaca de Bolivia was formerly the largest producer of zinc, but during recent years most of the zinc mined has come from the Sur Chichas country near the Argentine frontier and is exported through Villazon. It has also been mined in the Colquiri district of the Department of La Paz and at Huanuni in the Department of Oruro. Exports in 1917 were distributed among the following countries: Great Britain, 302,471 kilos; Argentina, 60,510 kilos; France, 60,000 kilos; and the United States, 4,066 kilos.

MOLYBDENUM.

Molybdenum exists in several parts of Bolivia, but particularly in the Andean region about Sorata, which lies northeast of Lake Titicaca. It is also found in the Chichas country to the south of Uyuni and has been encountered in the Department of Oruro. However, the industry has reached no such development as it has in the deposits of the Department of Junin in Peru, which produces about 80 per cent of the world's supply. Little has been done to work the Bolivian deposits, and exports have been small, amounting to 6,101 kilos, valued at 19,157 bolivianos, in 1915, and 704 kilos, of a value of 3,168 bolivianos, in 1916. All of this was produced in the Department of La Paz, and all of it was exported to England. No exports are officially recorded for subsequent years, and it is understood that no exploitation has taken place since 1916.

It is generally found as the sulphide and scattered through deposits of quartz, which makes it very hard to work. It has also been found in connection with tungsten ores. The industrial application of molybdenum was formerly restricted to the manufacture of molybdenate of ammonia, a reagent for sulphuric acid, and of sodium

molybdenate, which is used for giving a blue shade in ceramics, and for dyeing silks and other textiles. It is now used in the manufacture of smokeless powder, but particularly as an alloy with steel. It has been found to harden steel without affecting its malleability. Molybdenum is also finding increased use in the preparation of steel for automobile springs.

GOLD.

Though gold is widely found in Bolivian streams, its production has greatly declined during the past few decades, and the gold mining industry is at present almost nonexistent. Yet large quantities of gold were produced during the colonial era; and even during the last half of the eighteenth century, when the decadence was well under way, more than \$16,000,000 worth of gold was produced in the provinces of Larecaja and Caupolican alone. In 1904 the output for all Bolivia was 5,790 ounces, of which 3,500 ounces was produced by the Incaoro and Olla de Oro companies. According to official statistics the exports of gold, exclusive of gold coin, during the period 1908-1916 were as follows:

Years.	Kilos.	Years.	Kilos.	Years.	Kilos.
1908.....	35.49	1911.....	55.05	1914.....	180.07
1909.....	42.59	1912.....	78.30	1915.....	178.38
1910.....		1913.....	93.55	1916.....	4.50

There are no records of exports since 1916.

The Bolivian gold fields extend over large areas of the country, though the mining industry is largely concentrated in one district of the Province of Larecaja in the Department of La Paz. One field extends from the Province of Muncas eastward with wide breaks to the basin of the Itenez and the Brazilian border. In its western part this belt includes the Provinces of Muncas, Larecaja, Caupolican, Nor and Sur Yungas, Inquisivi, and Loaiza, all of which lie among the high Cordillera Real or in the montaña region. It reaches across the Department of Cochabamba, where evidences of gold are rare, into Santa Cruz, where the Chiquitos highlands and the country to their north constitute a very clearly defined auriferous zone. This belt includes the lode deposits and placers of Tipuani, Suches, Chuquiaguillo, Aropaya, Yani, and Cavari in the western part, and San Simon, San Javier, and the washings along the Itenez affluents in the remote eastern region. In the far northwest is another field of little explored alluvial deposits about the upper reaches of the Madre de Dios and its tributaries and largely comprehended within the Territory of Colonias. Another field, no longer worked, exists in the southern part of the Republic and extends as far north as the Chayanta country and the mountains of Potosi. It includes parts of the Lipez and Chichas Provinces, Mendez and Cinti in Chuquisaca, and reaches down into Tarija to the southeast and into Santa Cruz in the northeast. This belt includes the deposits of San Juan del Oro, Amayapampa, Suipacha, Esmoraca, Sierra Gorda, and Chuquichuqui.

The Incaoro Co.'s mines at Pallaya and the Olla de Oro Co.'s mines east of La Paz are the only lode gold mines that have been operated within the past few years, and these mines are now idle. In the placer field to the northeast of La Paz the natives still wash gold along the banks of several auriferous streams, but, as their product is disposed of clandestinely, no official estimate of production from this source is possible. Operations along the Tipuani have largely been restricted to development work carried on by the Bolivian Gold Exploration Co., an American enterprise that controls the principal placer deposits of the lower course of the river—a region of considerable productivity in earlier times. This concern has been occupied in constructing a 10-mile ditch, but it has been hampered by an adverse climate, scarcity of labor supply, and difficulties of transportation. Nine tunnels have been built in connection with this work. Water from the Grito River is to be used to furnish power for the operation of the hydraulic equipment installed on the Colorado Playa. A few years ago the Incahuara Gold Dredging Co. failed in attempts to dredge the bed of the Tipuani below its junction with the Kaka. The dredge which was used to work the Chuquiguillo deposits a short distance out of La Paz, and which led to the finding of some unusually large nuggets, has been abandoned.

In eastern Bolivia the basin of the Quisere River passes through the three auriferous regions of Concepcion, San Javier, and San Simon. The placer beds of San Javier were once worked by the Jesuits, as were also the deposits of the San Simon district in the Itenez country, and the Chuquicamini lode deposits of Inquisivi in the Cordillera Real. The San Miguel River, which has a quartz bed and skirts some low mountains where gold is known to occur, possesses alluvial deposits which could be worked with dredges for part of the year. However, little has been done in recent years to exploit the gold resources of the three northeastern Provinces of Santa Cruz where the metal is found.

OTHER MINERALS.

Nickel has been found in several districts in Bolivia, usually in combination with other metals, and sometimes in arsenical combinations that make it nearly valueless. However, little exploitation has been done, and this only in the region between Oruro and Cochabamba. In 1917, 6,146 kilos, with a total value of 17,828 bolivianos, were exported, and in 1918 exports amounted to only 399 kilos, all of which came from the Sorpresa district in the Province of Tapacari, Department of Cochabamba. In the decade 1908–1917, 5,121 kilos of cobalt, with a value of 4,385 bolivianos, were exported. Iron and mercury are found in the Provinces of Cordillera and Vallegrande in Santa Cruz. Iron is also found in the Itenez basin and in other parts of Bolivia, but has not been developed on any commercial scale. In the four years between 1908 and 1913, 8,747 kilos of mercury were exported.

Among nonmetallic minerals produced in Bolivia are salt, lime, kaolin, asbestos, sulphur, borax, coal, lignite, and petroleum. "Salares" or salt beds cover large areas in the Coipasa district to the west of the main line of the railway between Uyuni and Oruro

and extend well down toward Uyuni. The crude salt is carried from the vicinity of Garcimendoza, about 163 kilometers (101 miles) from Oruro, and widely distributed over the country. Salt is also found to the north of Potosi and about Ayoma, west of Colquechaca. In 1918 3,650 kilos were exported to Argentina from the Province of O'Connor in the Department of Tarija. Salt beds in the northern Chaco, lying well to the south of San Jose de Chiquitos, are also worked.

Asbestos of a good quality exists among the mountains north of Cochabamba, and a high grade of kaolin or porcelain clay is found in the Huanuni district.

Beds of sulphur and borax have been found in the Caranga and Nor Lipez regions bordering the Chilean frontier.

Coal and lignite have been found in various parts of the plateau. Coal is known to exist in the Copacabana Peninsula, which juts out into Lake Titicaca, where the deposits are controlled by an Italian concessionaire. Tests have shown that this coal possesses good burning qualities, in spite of impurities that exist in connection with it. Coal has also been found near the line of the Arica-La Paz Railway and large deposits of good coal are reported to have been discovered across the mountains from Sorata. A good grade of lignite is found in the Cordillera Oriental about Colomi near Cochabamba. Extensive peat beds on the outskirts of La Paz are being worked by local interests, though as yet on a small scale. These beds cover an area of about 2,500 acres, with a depth of peat varying from 16 to 24 feet. It is estimated that these fields contain about 150,000,000 cubic meters of peat, which would yield 30,000,000 tons of dried peat briquets. This peat is said to have a fuel value equal to one-half that of coal and a little greater than that of firewood.

MINING DISTRICTS AND PRINCIPAL INTERESTS.

ARACA.

This mining district is located at the north end of the Cordillera de Las Tres Cruces, a range separated from the massif of Illimani to the north by the valley of the La Paz River. The mines are at an altitude of 15,000 feet and higher. The product mined is tin.

Sociedad Empresa de Estano de Araca.—The company that exploits these mines is Chilean, with home offices in Santiago, though the local German firm of Boettiger & Trepp is also heavily interested. It was established in 1917. The company is making preparations to install a large amount of new German equipment. The net earnings of the company for 1919 amounted to 841,813 bolivianos. A 35 per cent dividend was paid for the year, and another dividend of 15 per cent was paid for the first two months of 1920. The total output of the mines for 1919 was 379,026 quintals, with an average tin content of 4.85 per cent and some ores assaying at 10.4 per cent. After treatment the ore produced 22,831 quintals of 62.38 per cent and 63 per cent barrilla or concentrate; 9,974 quintals of "guia" or high-grade ore running 61 per cent tin were also produced. The average cost of production per quintal for the year was 36.43 bolivianos.

ARAMAYO-FRANCKE.

Aramayo-Francke Mines (Ltd.).—The mines controlled by this company are located in the Chichas region, tributary to the Atocha branch of the Bolivia Railway. The most important properties are Chorolque, Tasna, and Chocaya. The mountain of Chorolque is situated about 25 miles northeast of Atocha, with which it is connected by a mountain trail. It is a pyramid of quartz trachyte or andesite rising nearly 3,000 feet above the surrounding plateau to a height of 20,000 feet. Mining operations in this locality are centered about two groups of mines, the older Chorolque group, which has a mill at 16,000 feet and workings to 18,000 feet, and a second group on the other side of the mountain. Tasna lies farther to the north and about the same distance from the railway. Chocaya lies to the west of the railway and a few miles northwest of Atocha. The company has concentrating and smelting plants at Quechisla, Buen Retiro and Cotani, and a reduction plant for silver ores is being erected at Atocha. Other properties of the company are Asllani, Santa Barbara, and Sala Sala, all of which are in the vicinity of Chorolque. The Aramayo-Francke company has had a virtual monopoly of bismuth production in Bolivia, most of its bismuth output being derived from Chorolque and Tasna. These mines also produce tin, copper, and wolfram, and during the war were large producers of antimony. The principal product of the Chocaya mines is silver, with some tin.

During 1919 the output of the company's mines, exclusive of bismuth, was as follows:

Black tin.....	tons..	2,236
Silver (mostly in precipitated sulphides of approximately 60 per cent silver, and the rest ore of approximately 6 per cent silver).....	troy ounces..	700,000
Copper (cement, averaging about 57 per cent copper).....	tons..	100
Wolfram.....	do.....	78

Copper matte is also shipped intermittently.

Exports of bismuth during 1918 were as follows:

Kinds.	Tasna.	Quechisla.
	<i>Kilos.</i>	<i>Kilos.</i>
Bars.....	220,205	26,566
Concentrates.....	12,600	18,663
Residues.....	21,909	32,089
Unconcentrated ores.....		8,220

The output of this company for the years ended June 30, 1914 to 1917, exclusive of bismuth, was as follows:

Years.	Black tin.	Copper matte.	Silver ores and sulphides.	Wolfram.
	<i>Tons.</i>	<i>Tons.</i>	<i>Troy ounces.</i>	<i>Tons.</i>
1913-14.....	3,442	342		
1914-15.....	2,060	111		
1915-16.....	2,095	19	110,000	148
1916-17.....	2,039	118	523,284	227

The Aramayo-Francke company is an English firm, with headquarters in London. The interests originally represented a partnership between the Bolivian, Don Avelino Aramayo, and his metallurgist, Francke. The present company was organized in England in 1906. The first properties cost £494,090 (\$2,404,489) in fully paid shares, the rights to Chorolque being acquired in 1908 for £139,999 (\$681,305). The present capitalization is £600,000 (\$2,919,900). The following dividends were paid during the years ended June 30, 1911 to 1917: 1910-11, 12½ per cent; 1911-12, 15 per cent; 1912-13, 17½ per cent; 1913-14, 19 per cent; 1914-15, 7½ per cent; 1915-16, 10 per cent; 1916-17, 30 per cent.

The general manager in Bolivia has headquarters at Quechisla. There are agencies at Uyuni, Atocha, and Tupiza. Most of the company's equipment is of English manufacture.

BERENGUELA.

The Berenguela tin-mining district is located in the canton of Coleha in the Department of Cochabamba and near the railway which connects that city with Oruro. Low-grade ore exists here in large bodies. The company's mill was recently remodeled.

The *Berenguela Tin Mines (Ltd.)* is an English corporation and was organized in London in 1905. The authorized capital is £20,000 (\$97,330), of which only £6,938 (\$33,764) has been issued. A dividend of 20 per cent was paid in 1917, and 15 per cent was paid in 1919. The production of tin concentrates for the years ended June 30, 1915 to 1918, was as follows: 1914-15, 193 tons; 1915-16, 324 tons; 1916-17, 348 tons; 1917-18, 244 tons. The production at present is about 30 tons of "barrilla" a month.

CARACOLCS.

Guggenheim Mining Co.—In 1920 the Guggenheim mining interests acquired a group of tin mines in the Province of Inquisivi, in the Department of La Paz, and are now making elaborate preparations for their development. The six mines acquired are known as Pacuni, Huanchaca, Caracoles, Bengala, Salvadora, and Bonaparte. The first three of these mines form a single group within a short radius of each other, while the last three are located several miles away and constitute another clearly defined group. All of these mines are located in the high Andes, the Caracoles mine being at a height of over 18,000 feet above sea level. Titles have been secured to about 5,800 hectares (hectare = 2.47 acres), and petitions have been filed for about 3,000 more hectares of mining properties in the same region. The Caracoles mine was bought from a group of interests consisting of Dr. Arturo Guzman (a Chilean), David Bricker, and George Pringle. The Pacuni and Huanchaca mines were acquired from B. N. Dillon and the others from Easley and Insley, of La Paz.

All of these are tin mines, the ore running from 3 to 25 per cent. As is usually the case in Bolivia, the ores are complicated by the presence of other minerals, especially silver and wolfram.

The company is now constructing an automobile road from the Eucalyptus station of the Bolivia Railway line, between Oruro and La Paz, to the mines. The total length of this road is about 66 miles. It promises to be one of the best mountain roads in Bolivia and will

represent an expenditure of about 1,000,000 bolivianos. Water and power rights have been secured to about six streams in the vicinity of the mines, and a power plant is to be erected on the most advantageous site. It has not yet been decided whether the company will ship out its product as "barrilla" or install a smelting plant at the mines. The questionable practicability of electric smelters is one of the principal factors in the decision.

The Bolivian offices of the Guggenheim interests are at La Paz.

COLQUECHACA.

The Colquechaca mining district is situated in the Province of Chayanta in the northern part of the Department of Potosí. The town of Colquechaca lies at an elevation of about 14,000 feet, and the surrounding hills rise about 4,000 feet higher. The principal outlet for this region is over the cart road that terminates at Challapata on the railway between Oruro and Uyuni.

This region formerly contained some very important silver mines, but has lately been of little consequence. The "socavon" or shaft of San Bartolome, which was opened in 1700, produced more than \$10,000,000 worth of silver in 26 years of the last century. However, the most productive mines were flooded about 40 years ago.

Simon Patiño has lately taken over one of the old producers and is installing a hydroelectric plant for the purpose of draining the old workings, after which development work on a large scale will be undertaken.

Between 1900 and 1912 the output of such mines as were in operation was as follows: 1900, 411 tons; 1901, 274 tons; 1902, 253 tons; 1903, 158 tons; 1904, 97.8 tons; 1905, 87 tons; 1906, 108 tons; 1907, 146.3 tons; 1908, 154 tons; 1909, 154 tons; 1910, 142 tons; 1911, 127.5 tons; 1912, 121.7 tons. Most of the ores consist of silver sulphides, with antimony in combination.

The *Compañía Gallofa Consolidada de Colquechaca* is a new company with home offices in Sucre, where most of the capital stock of 1,275,000 bolivianos is held. This company has recently installed a new reduction plant on its property. In 1918, 6,600 quintals of tin concentrates, running from 48.5 to 60.5 per cent tin, and 1,310 quintals of silver ore, with a metal content of 8,901 marcos, were produced. Net profits in 1917 amounted to 82,148 bolivianos and in 1918 to 10,826 bolivianos.

COLQUIRI.

The Colquiri tin-mining district is located in the high Cordillera Real of the Province of Inquisivi and to the south of the Caracoles district.

The *Compañía Minera de Colquiri* is a Chilean company, which was originally organized in 1907 and reorganized in 1913. It is capitalized at £150,000 (\$729,975), and its claims cover about 250 acres of land. This company has had many difficulties in management and has not progressed in recent years.

The *Compañía Fortuna de Colquiri* is another company that operates in the same district. The total exports of tin "barrilla" from the Colquiri mines in 1918 was 105,145 kilos, with a total value of 288,935 bolivianos.

COROCORO.

This, the most important copper-mining field in Bolivia, is located in the Province of Pacajes, Department of La Paz, and near the line of the Arica-La Paz Railway, from which a spur is run to the mines. The predominant rocks in the Corocoro field are reddish sandstones. The ore bodies consist of layers of sandstone through which are disseminated small particles of copper. Large sheets of native copper are occasionally encountered. Most of the ores contain from 3 to 4 per cent of copper, though in parts they run much higher.

Two companies are engaged in operations in this field—the *Compañía Corocoro de Bolivia*, a Chilean concern, and the *Corocoro United Copper Mines (Ltd.)*, an Anglo-French company.

Compañía Corocoro de Bolivia.—The Chilean company was originally incorporated in 1873 and has a capital of 1,025,000 bolivianos. The home office of the company is in Santiago. The general manager of the mines at Corocoro is a Chilean, who is one of the foremost authorities on Bolivian geology.

Most of the ores worked contain from 2½ to 4 per cent copper, the richer native copper deposits having been largely worked out. The new flotation mill installed in 1920 for the treatment of the ores has a capacity of 800 tons of ore per day. With a daily production of between 200 and 300 tons of ore, the output was from 10 to 12 tons of copper per day. Power is furnished by 3 English Diesel engines with a total horsepower of 650, but the rest of the equipment is largely of American manufacture.

Corocoro United Copper Mines (Ltd.).—The Anglo-French company was organized in 1909, and is capitalized at £700,000 (\$3,406,550), of which £673,607 (\$3,278,108) has been issued. The company took over the properties of J. K. Child (Ltd.), the *Sucesión Noel Berthin*, the *Compañía Sud-Americana de Cobre de Corocoro* and *Carretas Hermanos*. The combined properties aggregate about 515 hectares. The main office of the company is at 7 Rue des Italiens, Paris, and there is also an office in London. The representative of J. Lionel Barber & Co. at Arica has charge of the local interests of the company.

From 200 to 400 tons of ore are produced daily. The better ores are hand picked for native copper, and some of the high-grade ores are sent down to Arica for treatment at the company's smelter. The remainder is sent to the flotation mill for treatment. The ore is first ground by a jaw crusher and then reduced to powder in a ball mill. In the Chilean mill the ore is then mixed with tar and in the Anglo-French mill with oil, after which the solution is passed over the jig table to further the process of concentration. The "barrilla" produced by this treatment has a copper content of 50 per cent and upward. In this form it is shipped in bags to Arica. The monthly production of metal is usually over 400 tons.

The profits for the company for the year ended June 30, 1918, were £168,128 (\$818,195), from which a dividend of £155,448 (\$756,488) was paid. The profits for the last half of 1918 were £11,517 (\$202,188). Nearly all the machinery of this company is of American manufacture, and the mill superintendent is of American nationality.

The comparative production of "barrilla" by the two companies during the years 1912-1918 was as follows:

Years.	Corocoro United Copper Mines (Ltd.).		Cía. Corocoro de Bolivia.		Other producers.	
	Kilos.	Per-centage.	Kilos.	Per-centage.	Kilos.	Per-centage.
1912.....	3, 225, 909	59. 13	2, 127, 222	39. 00	102, 248	1. 87
1913.....	2, 247, 400	44. 42	1, 711, 964	33. 82	1, 101, 008	21. 76
1914.....	4, 442, 177	51. 26	3, 686, 897	42. 53	538, 364	6. 21
1915.....	11, 754, 531	49. 41	11, 310, 193	17. 49	738, 074	3. 10
1916.....	14, 045, 798	48. 42	13, 348, 300	46. 01	1, 617, 026	5. 57
1917.....	19, 245, 119	51. 39	15, 332, 200	40. 96	2, 867, 581	7. 65
1918.....	19, 628, 299	75. 47	5, 700, 800	21. 91	671, 282	2. 62
Total.....	74, 589, 233	.....	53, 217, 576	.....	7, 635, 583	.....

HUANCHACA.

Compañía Huanchaca de Bolivia.—The mining district of Huanchaca-Pulacayo lies in the Province of Porco, Department of Potosi, about 19 miles from the town of Uyuni. The mines are situated in a group of hills that are the extreme southern outposts of the Cordillera de los Frailes. The mines comprise some of the oldest and most famous in the country. The deposits were worked by the natives before the coming of the Spaniards, and were later exploited on a large scale by the Spaniards themselves. After a period of suspension, work was resumed in the seventies of the last century by a French company, which was organized in 1873 and for a time was controlled by Jacques Lebaudy. After the death of Lebaudy the mines were disposed of to their present Chilean owners. American interests have recently opened negotiations with a view to the purchase of the mines and their restoration to their former productivity.

These mines were for a long time exceedingly productive. Between 1873 and 1901 they produced 4,250 tons of silver, and their exports of silver and lead between 1873 and 1888 had a total value of more than \$50,000,000. For some time a regular dividend of £400,000 (\$1,946,600) was paid annually. The last dividend was paid in 1908, when a 4 per cent dividend was paid on the 125-franc shares, into which the capital of 12,800,000 bolivianos is divided.

Serious obstacles have been encountered by the Chilean company in its efforts to operate the mines. In 1917, with a production of 40,413 tons of ores, there was a deficit of £13,173 (\$64,106), due to increased costs of materials, the poorer quality of the ores mined, and unfavorable exchange conditions. For many years, also, the low price of silver operated against the company. However, the most serious difficulty which the present owners have had to face has been the results of the flooding of the lower levels of the mine, which took place in 1895. Until this problem is met successfully there is little possibility that the mines can be made to pay, in spite of the skill and energy of the engineers in charge. An entirely disproportionate share of the proceeds of the company must be devoted to the work of draining the mine.

At present there are about 80 kilometers of galleries in the mountain at Pulacayo. The maximum depth reached is 536 meters (1,759

feet), this being the greatest depth attained in any mine in Bolivia. However, there are now more than 90 meters (295 feet) of water, with a temperature of 70° C., in the mine, so that the lower—and richer—levels can not be worked. Two powerful Ehrhardt pumps work continuously, raising 120 liters (32 gallons) of water per second to a height of 360 meters (95 feet). These are aided by several smaller pumps of 60 to 90 horsepower, yet during 1919 all these pumps, which used 1,200 of the 2,000 horsepower generated at Pumatará (80 kilometers—50 miles—distant), were not able to gain on the water pouring into the lower level of the mine, but were only able to keep it from encroaching on the unflooded levels. At that time the company planned to acquire two more pumps of 500 horsepower. Proposals have been made for tunneling through the mountain to the plain of Uyuni for the purpose of draining the mine, but it has been calculated that this project would necessitate the construction of a tunnel several miles long and would cost about 11,000,000 bolivianos. As the lowest levels of the mine are beneath the level of the plain of Uyuni, the water would still have to be raised a certain distance by means of pumps in order to enable it to drain out onto the plain.

The greater part of the older equipment of the company is of French make, though some of the shop equipment has been supplied by various British manufacturers. The company operates its own railway line to Uyuni, at which point connections are made with the Antofagasta & Bolivia Railway. From 400 to 800 laborers are employed at the Pulacayo mines and in the reduction plant at Huanchaca, which lies on the other side of the mountain. A tunnel through the mountain connects the two places.

Though silver is the most important product of the mines, lead, zinc, copper, tin, antimony, and gold are found in the complex ores mined, and some of these metals are extracted for export. The production of ores, which run from 5 per cent upward of silver, is normally between 1,500 and 2,000 metric tons per month. Most of the ore is sold to American interests. Enormous dumps below the mouth of the mine at Pulacayo contain about 22 ounces of silver to the ton.

The home offices of the Huanchaca company are at Valparaíso. Until recently Arturo Alessandri, now president of Chile, was president of the company. The general manager resides at Pulacayo. An American acts as the company's agent at Antofagasta.

The following statements from the company's report will show the result of operations during 1919:

Accumulated losses from former years amounted to £133,610 (\$650,214), while the profit for 1919 was £48,562 (\$236,325), leaving an unfavorable balance of £85,049 (\$413,889). To wipe out the unfavorable balance, the council withdrew from the reserve fund £15,049 (\$219,229) and from the development fund £40,000 (\$194,660). The statement of the company then stood as follows:

Capital paid up.....	£1, 600, 000	(\$7, 786, 400)
Reserve fund.....	19, 535	(95, 065)
Development fund.....	24, 583	(119, 635)
Total.....	1, 644, 118	(\$8, 001, 100)

FIG. 11.—MINES OF PULACAYO.

FIG. 12.—CONCENTRATING MILL FOR TIN ORES AT HUANUNI.

FIG. 13.—THE CERRO OF POTOSI.

FIG. 14.—COPPER MINES OF COROCORO.

The report declared the results of operations during 1919 "poor," in spite of the high price of silver. This was due largely to the fall of the franc in relation to the pound sterling, causing a loss of £83,137 (\$404,586). It was expected that the new contract made with the American Smelting & Refining Co. would prevent the recurrence of such loss.

The total production of ores during 1919 was 41,575 metric tons, of which there was exported 17,359 metric tons, with an approximate value of £256,721 (\$1,249,321). Reduction operations yielded products valued at £299,912 (\$1,459,522). The surplus remaining from 1918 was £7,757 (\$37,747), and the profit from stores was £1,628 (\$7,924), making the total receipts £309,297 (\$1,505,193).

Expenses for the year were as follows:

Development work.....	£19, 580	(\$95, 285)
Operating expenses.....	58, 201	(283, 236)
Drainage.....	32, 561	(158, 460)
Preparation and selection of metals.....	9, 919	(48, 272)
General expenses.....	37, 518	(182, 579)
Freights.....	44, 560	(216, 853)
Costs of concentration.....	20, 596	(100, 229)
Costs of lixiviation.....	34, 699	(168, 864)
General expenses of mine.....	5, 119	(24, 913)
Costs of "El Asiento".....	724	(3, 522)
Pyrites unsold in Antofagasta.....	2, 098	(10, 210)
Blendes unsold in Antofagasta.....	6, 919	(33, 672)
Expenses for shipments of metals.....	2, 550	(12, 412)
Loss in exchange.....	1, 188	(5, 784)
Employees' aid, etc.....	1, 245	(6, 049)
Total.....	277, 477	(1, 350, 340)

HUANUNI.

The balance for the year was £31,820 (\$154,853).

The Huanuni mining district is situated southeast of the city of Oruro and on the railway line that Simon Patiño is building from Machacamarca to Uncia.

The *Empresa Minera de Huanuni* is one of the properties of Simon Patiño, who also owns the rich Uncia mines. Sr. Patiño acquired the mines in 1911 from the Cía. Minera El Balcon and the firm of Penny & Duncan, which had long worked the same vein. The total price paid was about \$2,000,000. The main workings are located on the south side of the Cerro of Pozoconi, a mountain that rises to an elevation of 14,638 feet. Placers have been worked in the valley below, and mining has been carried on through a number of tunnels in the hill. The deposits of higher-grade tin oxides have been largely worked out, and sulphides are now being taken out. The properties include 226 hectares in the Pozoconi hill and 108 at Gualacunca. The ore is carried down to the concentrating plant by means of seven cableways. One of the most modern mills in Bolivia was recently installed to treat the ores. This plant has a daily capacity of 350 tons of ore, the ore running from 1½ to 3 per cent tin. The output of tin is about 250 tons a month of high-grade barrilla. Power is furnished by Diesel engines.

The *Compañía Porvenir de Huanuni* is a Chilean company, with offices in Valparaiso. A representative is also maintained in Oruro. Deposits of complex ores are worked, containing chiefly silver, but

also holding lead, zinc, and tin. The company is capitalized at £175,000 (\$851,638). Profits from operations in 1919 amounted to £58,470 (\$284,543). No dividend was declared, but £40,969 (\$199,376) was set aside for future dividends. The statement of the company's resources was as follows: Capital, £175,000 (\$851,638); reserve fund, £15,000 (\$72,998); working fund, £10,000 (\$48,665); fund for future dividends, £57,118 (\$277,964); total resources, £257,118 (\$1,251,265). The stock of ore in sight at the end of 1919 was estimated at 27,855 tons, with an estimated silver content of 1,911,500 troy ounces. During 1919, 8,129 metric tons of ore were produced. Of this quantity 1,880 tons were exported, with a metal content of 462,000 ounces silver, or an average of 77 "marcos" to the ton. The remaining 6,250 tons was sent to the ore dumps for later treatment. The latter was expected to produce about 445,000 ounces of silver. The company also plans to work the ores for lead and zinc, and to extract tin from the residues, which contain about 2 per cent tin.

LLALLAGUA.

Compañía Estañífera de Llallagua.—The Llallagua tin mines, the richest in the world, are located in the Province of Bustillo, Department of Potosí. However, they are much nearer the city of Oruro than that of Potosí. They are situated on the opposite side of the mountain in which the Uncia deposits lie. A plan of the Llallagua-Uncia field, drawn up by Government engineers, is included in the mineralogical atlas published by the Ministry of Justice and Industry in 1912 as an appendix to the minister's annual report or "memoria."

The Llallagua company is a Chilean corporation, which was organized in 1906. The home offices are at Santiago. The company is capitalized at £425,000 (\$2,068,263) in £1 shares. Duncan, Fox & Co. act as agents of the company at Arica and Antofagasta. Only persons with the fullest confidence of the company are allowed to visit the underground workings at Llallagua. On April 29, 1920, 147,800 of the 425,000 shares were registered as belonging to Duncan, Fox & Co. and 41,043 shares to the English Banco Anglo-Sud-Americano. However, it is understood that Simon Patiño has obtained a very large interest in the Llallagua, though the shares are not registered in his name.

There has been a large amount of speculation in "Llallaguas" on the Santiago and Valparaiso exchanges. The highest price paid in 1918 was 292. During 1919 the stocks rose from 155 to 489½, but with many up-and-down fluctuations. Early in 1920 they reached 520, but on July 8 were quoted at 225 in Valparaiso. After the revolution in Bolivia on July 12 there was a further rapid decline in quotations of Chilean stocks, including "Llallaguas."

The company has a concentration mill at Catavi, and a subsidiary owns the smelter at Arica, which has not, however, realized the expectations of its builders. Most of the barrilla produced is shipped to the United States for smelting. A new hydroelectric plant was recently installed. Most of the very modern equipment at Llallagua is American. Though the monthly output is from 1,400 to 2,000 tons of barrilla per month, the mill is being prepared to handle 600 metric tons of barrilla per day.

The tremendous productivity of Llallagua is illustrated by the following table covering the production of "barrilla" during the period 1911-1919:

[Spanish quintal=101.41 pounds; Chilean gold peso=\$0.365; pound sterling=\$4.8665.]

Years.	Annual production.	Average monthly production.	Cost of production per Spanish quintal.	Profit per Spanish quintal.	Average price of tin.	Annual profit.	Dividends paid.
	<i>Spanish quintals.</i>	<i>Spanish quintals.</i>	<i>Chilean gold pesos.</i>	<i>Chilean gold pesos.</i>			
1911.....	83,082	6,923.50	22.95	31.55	£191	£196,598	£191,250
1912.....	80,768	6,730.50	24.23	39.59	208	239,855	85,000
1913.....	114,938	9,577.50	33.96	19.26	201	166,056	127,500
1914.....	117,558	9,796.50	24.31	17.37	152	153,169	63,750
1915.....	119,957	9,996.41	25.92	29.28	161	263,404	127,500
1916.....	165,534	13,794.50	21.42	37.54	182	466,123	340,000
1917.....	249,589	20,799.08	19.01	75.17	237	1,407,048	637,500
1918.....	394,275	32,856.25	20.65	58.70	330	1,735,823	2,018,750
1919.....	335,270	27,939.16	24.39	91.43	257	2,299,070	425,000

The rate of dividends for the years 1916-1919 was as follows: 1916, 45 per cent; 1917, 100 per cent. The dividend for 1918 amounted to 475 per cent and for 1919 to 100 per cent. A 35 per cent dividend was paid for the first two months of 1920. The total dividends paid from 1906 to the end of 1919 amounted to £4,791,875 (\$23,319,660), or more than 1,100 per cent on the capital stock.

The production of ore and "barrilla" in 1918 and 1919 was as follows:

Years.	Ore.		Barrilla.	
	Metric tons.	Percentage of tin.	Spanish quintals.	Percentage of tin.
1918.....	99,407.8	17.09	394,275	69.94
1919.....	91,333.9	14.71	335,270	68.52

The higher cost of production of ore for 1919—3.41 bolivianos per quintal, as against 2.38 bolivianos for 1918—was due to the shutting down of the mine during the prohibition of importation into the United States. The cost of production of "barrilla" placed in storage at the Catavi plant, including cost of sacking, was 34.79 bolivianos per metric quintal, or 16 bolivianos per Spanish quintal, in 1919, as against 11.48 bolivianos per Spanish quintal in 1918.

On December 31, 1919, the ore reserves in sight were estimated at 406,073 metric tons, with an average tin content of 10.53 per cent, or a total content of 42,785 metric tons of tin. At the rate of 1,400 tons of 68 per cent "barrilla" per month, these reserves would furnish material for operations for three and one-half years. However, new deposits are anticipated in the meantime.

The complete statement of the company's financial resources at the end of 1919 was as follows:

Capital.....	£425,000	(\$2,068,263)
Reserve fund.....	100,000	(486,650)
Fund for future dividends.....	1,218,643	(5,930,524)
Fund for new works.....	480,000	(2,335,920)
Development fund.....	200,000	(973,300)
Emergency fund.....	70,000	(340,655)
Fund for eventualities.....	50,000	(243,325)
Total.....	2,543,643	(12,377,637)

An oil flotation plant has lately been installed by an American metallurgist for the purpose of separating bismuth from tin ores, with a view to the production of the former metal.

MONTE BLANCO.

Empresa Minera Monte Blanco.—These mines are located at a height of over 16,000 feet in the Quimsa Cruz region of the Province of Inquisivi, Department of La Paz. The claims of the Chilean company which owns them cover 213 hectares. This company, whose home offices are in Santiago, was founded in 1906 and is capitalized at £280,000 (\$1,362,620). There are large deposits of low-grade ores running from 1½ to 2 per cent tin. In 1918 exports from the Monte Blanco mines amounted to 267,830 kilos of barrilla, with a total value of 755,361 bolivianos. Nearly all of this was shipped to Great Britain.

MOROCACALA.

Penny & Duncan.—The Morocacala tin-mining district lies about 25 kilometers southeast of Oruro, in the Province of Cercado. The mines are owned by the old British firm of Penny & Duncan. During 1918 this mine shipped out by Arica 1,285 tons of barrilla, running about 65 per cent, and in 1919 exported 1,759 tons. They are at present producing about 250 tons a month. The ores are concentrated at Machacamarea. Though much of the equipment of the mine is old, important improvements are in process of installation. A new shaft is being sunk, and Diesel engines have been put in, effecting a saving of 20,000 bolivianos a month in cost of operation. The Diesel engines operate General Electric generators, from which the power is distributed through the mine. With the exception of the electric motors, the equipment is largely of British manufacture.

OPLOCA.

Compañía Minera y Agrícola Oploca de Bolivia.—The properties of this Chilean company are situated in the Chichas region in southern Bolivia and are tributary to the railway from Uyuni to Atocha. This company was originally formed in 1858, but was not registered in Bolivia until 1907. The company was first capitalized at £140,000 (\$681,310), which was increased by £60,000 in 1917 (\$291,990), for the purpose of developing its Tatasi and Portugalete properties. In 1920 authorization was granted for the increase of its capital to £400,000 (\$1,946,600). The home offices of the company are in Santiago, and there is a "junta consultativa," or advisory board of directors, in Sucre, where most of the stock of the old Guadalupe company, which formed the nucleus of the Oploca, was held.

The company owns nearly 25,000 square miles of land. This vast property, which cuts athwart the road between Atocha and Tupiza into the Argentine, is an ancient "condado," the former estate of Diego de Arce y Chacon, Conde de Oploca, and later of his successors, the family of Yañez de Montenegro. Though much of the land is of little actual or potential value, the company has an ambitious scheme for the development of such of it as is capable of cultivation or of use for grazing purposes. American interests tried to buy the holdings a few years ago, and it was considered a "magnificent bargain" for the Chilean interests that secured them.

The mining holdings are distinct from the bulk of the agricultural property, and consist of the properties at Chocaya la Vieja, Tatasi and Portugalete, and Choroma. The Chocaya mines adjoin those of the Aramayo-Francke company in the same field. The product at Chocaya is tin with some silver. The mine here has large ore reserves in a long, continuous ore shoot, and extensive developments are under way for the purpose of increasing production. A new shaft, known as the Socavon Oploca, is being sunk, and a new concentration mill is to be built. A lixiviation plant for silver ores is already in operation. At Tatasi and Portugalete, which were formerly large producers of silver, development and exploration work is going on in anticipation of the commencement of active operations. The company declares its investigations to be entirely satisfactory as to the future productivity of this district. At Choroma, which lies near Tupiza, reconnaissance work is also in progress, and a mill is being installed.

The production of tin "barrilla" and "guia" (high-grade ore) by the Chocaya mine during the period between July, 1909, and June, 1919, was as follows:

Years.	Barrilla.	Guia.	Years.	Barrilla.	Guia.
	<i>Spanish quintals.</i>	<i>Spanish quintals.</i>		<i>Spanish quintals.</i>	<i>Spanish quintals.</i>
1909-10.....	5,586	.....	1914-15.....	35,556	4,851
1910-11.....	10,540	.....	1915-16.....	44,440	7,240
1911-12.....	18,977	1,400	1916-17.....	40,040	4,840
1912-13.....	25,258	7,700	1917-18.....	43,560	1,320
1913-14.....	28,652	7,351	1918-19.....	50,600	1,320

The "barrilla" produced in 1918-19 had a tin content of 59.4 per cent, and the "guia" averaged 57 per cent tin.

Profits for the year 1918-19 amounted to £77,451 (\$376,915). For the year ended June 30, 1915, they were £38,475 (\$187,239), and for the year 1915-16, £57,629 (\$280,452). The following dividends were declared for years ended June 30: 1915-16, 45 per cent; 1916-17, 45 per cent; 1917-18, 60 per cent; 1918-19, 45 per cent.

The maximum quotation for "Oplocas" on the Valparaiso exchange in 1918 was 105. In January, 1920, they were quoted as high as 206, but by July 8 had fallen to 143.

ORURO.

An important mining district is located in the range of hills on the outskirts of the city of Oruro. These hills rise about 1,200 feet above the level of the table-land and were worked for silver from

very early in the Spanish régime. The production of tin has partly compensated for the falling output of silver, as at Potosí.

The concern which formed the nucleus of the *Compañía Minera de Oruro* was established in 1879 to work the old Socavón de la Virgen mine. During the eighties the old Itos-Atocha and Colorada mines were acquired. The company was reorganized in 1912. It is a Chilean company, with home offices in Santiago, and is capitalized at 4,000,000 bolivianos.

The ores exploited in the cerro at Oruro are pyrite veins holding silver and tin. The ore runs about 1.3 per cent tin and 15.20 marcos of silver to the ton. The tin ores from the company's mines are sent to Machacamarca for treatment at its concentration plant. The higher-grade silver ores are sent to Tacoma, Wash., and the low-grade ores are sent to Chile for reduction. The company has a contract with the American Smelting & Refining Co. to take its tin barrilla. Quantities of copper cements are also sent to Tacoma for treatment. Most of the equipment used is American and German. At Oruro three Diesel engines of, respectively, 360, 200, and 130 horsepower are used. In 1919, 386 tons of crude oil were consumed, at a total cost of 119,574 bolivianos, two gas engines are used at Machacamarca. During 1919, 639 tons of anthracite were burned, at an expense of 134,341 bolivianos. Additional equipment of American manufacture has lately been installed at Machacamarca. The mines are unsteady producers, and doubts have been expressed as to whether the quantity of ore remaining is sufficient to justify the renovation of the company's equipment.

The ore reserves at the end of 1919 were estimated at 96,980 tons, with a silver content of 33,420 kilos and a tin content of 1,960 tons. The comparative production of silver and tin in 1918 and 1919 was as follows: Silver sulphides—1918, 16,979 kilos fine; 1919, 14,192 kilos. Tin—1918, 1,110 tons, 59.41 per cent tin; 1919, 1,020 tons, 58.95 per cent tin. Copper cements shipped in 1918 held 30.6 tons of copper, and in 1919, 19 tons. The net profit of the company in 1919 was 585,768 bolivianos. The accumulated dividend fund on January 1, 1919, was 1,730,359 bolivianos. The total funds at the disposal of the company—1,984,708 bolivianos—were distributed as follows:

	Bolivianos.
Transferred to reserve fund.....	5, 909
Fund for increment and eventualities.....	1, 952
Dividends:	
Sept. 4, 1919.....	323, 077
Mar. 9, 1920.....	356, 250
Retained in dividend fund.....	1, 297, 520
Total.....	1, 984, 708

According to the annual statement for 1919 the resources of the company at the end of that year were as follows:

	Bolivianos.
Capital.....	4, 000, 000
Reserve fund.....	300, 000
Fund for increment and eventualities.....	1, 510, 000
Fund for future dividends.....	1, 297, 520
Total.....	7, 107, 520

A dividend of 10 per cent was paid in 1916, and dividends of 20 per cent were paid in the three following years. Quotations on the Valparaiso exchange in 1919 fluctuated between 17 and 48.

The *Compañía San José de Oruro* has mining interests in the same hill as those of the Oruro company, and the ores produced are of the same general character. It is also a Chilean company, and is capitalized at £400,000. The tin ores of this company are sent to its concentration plant at Alantana, near Poopo, on the line to Uyuni. Most of its equipment is antiquated and was obtained from several different countries. For several years this company has been under the control of R. Valenzuela, a Chilean, who does a general importing and exporting business at Arica and Oruro. In 1920 the company was reported to be changing from corporate to private ownership and was at that time in process of liquidation.

Chilean interests control the *Compañía Estañífera de Vinto*, also known as the *Empresa Minera Vinto*. Its home office is in Valparaiso, and it is capitalized at £100,000 (\$486,650). Old tailings from the Spanish workings in the Oruro hills are being retreated.

The mine of the *Empresa Minera Santo Cristo* is located in the Cerro de San Cristobal, near Oruro. The ore runs about 6 per cent tin and 18 marcos of silver to the ton. The owners were attempting to float a new company in Chile in 1920.

The *Central Metalúrgico de Oruro*, a reduction company, operates a mill in Oruro, where it treats low-grade washed tin from the pampa near the city. It controls no mines of its own, but buys this low-grade ore from others. A new company was being organized in Chile during 1920 to take over this property.

PAZNA.

The Pazna tin-mining district is located in the Department of Oruro, a short distance from the Antofagasta & Bolivia Railway's Pazna station. The ore deposits are situated in the Cerro de Challa Grande, which is part of the Serranía, or range, of Achacollo. Grouped around the slopes of this cerro are the mines of Avicaya, Totoral, and Antequera.

The *Empresa Minera de Avicaya* is owned by Dante Abelli and son. The equipment of the mine is modern. The ores carry about 5 per cent tin, and after concentration in the company's mill are shipped as 60 per cent "barrilla." Though the production of this mine fluctuates greatly, its normal production is about 700 tons of "barrilla" per year.

The *Sociedad Estañífera Totoral Consolidada* is a Chilean concern, with home offices in Santiago. It is capitalized at 2,350,000 Chilean pesos. The ore deposits consist of a vertical vein in the Cerro de Challa Grande. Most of the ore in this vein has been washed down through the erosion of the mountain. The deposits resulting from the process of erosion have been worked by the *Compañía Estañífera de Antequera*, another Chilean company, control of which was recently acquired by the Totoral company. The Antequera company was capitalized at £150,000 (\$729,975), but its properties were bought by the Totoral interests for £35,000 (\$170,328). In 1919 the Totoral company had a profit of 497,008 Chilean pesos, and its total accumulated resources now amount to 3,506,278 pesos. During

the first three months of 1920 the company's mill at Palcamayu, which serves the mine known as La Reina de Negro Pabellon, produced 1,625 Spanish quintals of 62 per cent barrilla.

The *Compañía Estañífera El Acre (Empresa El Acre)* is a relatively small concern, which works placer tin deposits near Totoral. The deposits worked contain about 5 per cent of tin, and the monthly production is about 300 quintals of 60 per cent barrilla.

PORCO.

The Porco mining district lies near the railway between Rio Mulato and Potosi and a short distance from the Agua Castilla station, where the company's mill is located. The chief mineralized area is a mountain mass culminating in Abo Porco, which rises to a height of 17,000 feet. Ore deposits are also worked in another spur known as Huayna Porco. This was formerly a silver-mining district of importance, but the richer ores became exhausted and the mines were abandoned for a long time. The deposits are now being worked exclusively for tin.

The *Porco Tin Mines (Ltd.)* is an English concern, which was incorporated in London in 1912. The property was formerly owned by Bolivian interests. The company has an outstanding capitalization of £120,075 (\$584,345), in addition to £19,900 (\$96,843) in 6 per cent convertible debentures. It is closely affiliated with the Aramayo-Francke interests, Avelino Aramayo & Co. being its general agents in England, and Malcolm Roberts, general manager of the Aramayo-Francke mines in Bolivia, is chief consulting engineer.

The ore reserves in 1918 were estimated at 315,000 tons, with a tin content of 1.67 per cent. From Agua Castilla 319,159 kilos of "barrilla" were shipped in 1918, to a total value of 787,469 bolivianos. The company showed a profit of £777 (\$3,781) in 1918, as against a loss of £272 (\$1,324) for the previous year.

POTOSI.

The mining industry of the Potosi district centers about the famous peak known in history as the "Cerro Rico de Potosi," though there are less important mines at other points outside the immediate radius of the city of Potosi. The Cerro de Potosi is a cone-shaped mountain which rises about 2,500 feet above the level of the city or to a total height of 16,098 feet above the sea. The Spaniards began to work its rich deposits of silver ore in about 1545, and during the colonial régime the enormous quantities of silver taken out of the Cerro, variously estimated at \$1,000,000,000 to \$2,000,000,000, formed the principal basis of the mineral industry of the old viceroyalty of Peru. However, not only did the Spaniards ignore the tin and other metals existing in the Cerro, but the inadequate methods used in mining and smelting prevented them from securing the full benefits of their labors, so that the dumps left from their workings still contain a very appreciable quantity of metal. During the past few decades there has been a marked revival of mining in the Cerro, the present operators being comparative newcomers.

In addition to the more important mining interests engaged, numerous small operators work one or two galleries with the aid of a few Indians and sell their ore to the larger miners or to the regular

buyers of ores. In 1919 there were 742 "bocaminas" or mine entrances in the Cerro. The mountain is, in fact, honeycombed with galleries, which are connected throughout its interior. Conflicting claims have given rise to a great mass of litigation, not only because of disputes over original ground claims, but also because of the survival of a peculiar old Spanish law, now only applicable to the Cerro, whereby any miner must cease working on encountering the gallery of another miner, or must divert his own gallery in another direction in the hope of striking another vein of ore. Except in a few cases mining methods are still generally antiquated, being for the most part in the pick-and-shovel stage, with little use of power drills or mechanical equipment of any kind. The laborers are Indians or cholos, few of whom can be called expert miners. The ore is carried down the mountain to the concentrating plants on the backs of burros, though an "andarivel" or cableway is used in one instance. Consolidation of the mining properties in the Cerro is essential to their fullest working. During 1920 powerful American interests made a thorough survey of the Cerro with a view to such a consolidation.

The mining of tin in the Cerro began about 25 years ago and has now superseded silver in importance. In 1918 the total exports of tin barrilla from the Province of Frias, most of which was derived from the Cerro, amounted to 4,479,913 kilos, with a value of 10,921,368 bolivianos. Exports of silver for the same year were as follows: Ores, 85,269 kilos, valued at 57,667 bolivianos; sulphides, 19,789 kilos, valued at 315,622 bolivianos. Quantities of "rosicler" or native silver are still encountered. Some of the protochloride ores run as high as 75 per cent silver and the sulphides from 59 to 64 per cent.

The most important interests in the Cerro are those of *Luis Soux*, of French birth, who operates several mines and owns a smelter, in which he makes bars containing about 95 per cent tin. He also sends out large quantities of tin barrilla and silver ore. About 1,000 people are employed in all his workings. He uses hydroelectric power in his mines and mills, including his Velarde concentrating works. He has installed an Ingersoll-Rand air compressor at his mines.

The second most important interest in the district belongs to the *Bebin brothers*, also of French origin. These men have recently installed a new concentration plant, where the tin ores from their mines in the Cerro are prepared for shipment as barrilla. The equipment of this plant, which is one of the most modern in Bolivia, is of American manufacture. A Diesel engine is used for power. About 5 tons of barrilla, which runs from 55 to 60 per cent tin, are turned out per day. Probably 400 employees are on the pay rolls of the Bebims.

The *Royal Silver Mines of Potosi, Bolivia (Ltd.)* is an English concern, which is capitalized at £300,000 (\$1,459,950). It is known sometimes as the Anglo-Bolivian Mining Syndicate and is affiliated with the Aramayo-Francke mining interests. This company works, among other mines, the old "Real Socavon," which dates from early colonial times.

Among mining interests of secondary importance are those of Benavides, Cabrimonte, and Medinaceli.

Some placer tin mining has been carried on near Potosi. A British concern, known as the Bolivian Tin Mining Co., which was formed for the purpose of working the alluvial tin deposits in the bed of a river a few miles from Potosi, installed two powerful dredges, one at Aroifilla and the other at Chaca. The material taken out of the river bed contained about 20 per cent tin, and the Aroifilla dredge produced for a time upward of 110 tons of barrilla per month, running from 60 to 63 per cent tin, while the Chaca dredge produced 30 to 38 tons of barrilla per month. However, the burning of both of these dredges, which represented a very large investment, paralyzed the work of this company. The placer deposits were originally owned by Sr. Mendieta, of Potosi, and were successively held by American and Australian companies before coming into the hands of their present owners.

SUR YUNGAS.

International Mining Co.—The Yungas region is not of great importance as a mining district, though the lack of good transportation facilities is largely responsible for the failure to work such mineral resources as exist. Most of the deposits so far worked are located in a range which rises above the Rio Taquesi in the Province of Sur Yungas. The deposits of the Pichu district near Yanacachi are largely of tin ores and those of the Chojlla district consist of tin and wolfram. The most important mining enterprise is that of the International Mining Co., whose mines are located in the Chojlla district. This company was organized by W. R. Grace & Co. during the war, and is capitalized at 1,000,000 bolivianos. Its properties cover a total area of 3,500 hectares. It has exported as much as 1,200 quintals of tin barrilla per month, and during the war was a large producer of wolfram. An American is in charge of operations at the Carmen mine, where work is still being carried on.

UNCIA.

The Uncia tin-mining field is located in the Province of Bustillo, Department of Potosi, and is the objective of the railway from Machacamarea on the main line of the Antofagasta & Bolivia Railway. The Llallagua mines are located on the opposite side of the same hill in which the Uncia deposits lie. Both mines, in fact, work the same veins, and there was a long controversy between the Uncia and Llallagua interests. However, differences have been adjusted, and the rivals are now cooperating in building a large drainage tunnel to serve the interests of both.

The Uncia mines, which rank second to those of Llallagua in productivity, are the property of the Bolivian tin-mining magnate *Simon Patiño*. Sr. Patiño was one of the pioneers of tin mining in Bolivia and had confidence in the possibilities of the industry at a time when people believed in the natural monopoly of Cornwall and the Far East. He secured options on numerous mines and rich deposits of cassiterite ore, and through his persistence was able to secure the necessary capital to develop them. Sr. Patiño himself now lives in Paris, but his interests in Bolivia are in charge of Arturo Loayza, whose offices are in Oruro.

The richest of Sr. Patiño's Uncia properties is the mine known as "La Salvadora." The equipment of the mines and of the mills of Victoria and Miraflores is thoroughly modern and well arranged. There is probably no better organized plant in Bolivia. Power is furnished by Diesel crude-oil engines of German manufacture. Electric drills are used in the mines. Aerial cableways connect the Salvadora and Patiño tunnels with the mills. Part of the ore taken out of the Salvadora mine assays 57 per cent and is concentrated to 67 per cent "barrilla." Bismuth and wolfram are also present in the ores. In 1918, 10,114,135 kilos of barrilla, with a value of 28,451,487 bolivianos, were exported from Uncia to England. These exports were sent out through Mejillones.

OTHER COMPANIES.

There are numerous other mining companies in Bolivia. Some of these, which were formerly of considerable importance, are now entirely inactive or have greatly decreased their scale of operations. Others are quite small enterprises that work on a minimum of capital. Thousands of claims are held for future development or for speculative purposes. In nearly all cases the owners of these claims lack the capital necessary for their development.

Among the more important companies not described above are the *Compañía Porvenir de Lipez*, the *Sociedad Anónima Huayna Potosí y Milluni*, and the *Andes Tin Corporation*. The first of these is a Chilean company, originally organized in 1872 to exploit mines at Todos Santos in the Province of Nor Lipez, Department of Potosí. Its capital is registered at 6,000,000 bolivianos. The second is a French company operated by Huet Frères. It produces tin and bismuth. The Andes Tin Corporation is an American company, which owns the Concordia tin mines in the Inquisivi district. Though well equipped, these mines are not producing at present. Two American geologists called them "the most systematically worked tin mines in Bolivia."

PETROLEUM.

Serious interest in petroleum possibilities in Bolivia dates from about the year 1906. The presence of oil had long been known from the existence of seepages, particularly in the Caupolican and Lagunillas district, but from this time a number of comparatively small claims were acquired and registered, as much for the purpose of speculating in them as with the intention of actually working these properties.

DEVELOPMENTS CARRIED OUT.

In 1912 the Sindicato del Oriente Boliviano was organized by Sr. Luis Lavadenz, a Bolivian. The properties covered by this company consisted of 545,000 hectares of land in the Province of Azero, Department of Santa Cruz, and known as Pirano, Tacuri, Canalejas, and Parapeti. After spending about 300,000 bolivianos in surveys, etc., this company found itself unable to continue operations because of lack of capital. At this juncture Sr. Lavadenz went to Europe in search of the necessary capital, and while there interested Percival Farquhar in his oil schemes. Mr. Farquhar agreed to take over the rights of the company, and sent out a commission of engineers to Bolivia. These engineers surveyed the lands in question, as well as 80,000 hectares held by another company, the Sindicato de Sucre. During the course of their surveys they drilled two wells and found oil, which they declared to be of excellent quality. However, the collapse of the colossal projects of Mr. Farquhar in South America put an end to his efforts in this field, after about £40,000 (\$195,000) had been spent on reconnaissance work. The materials and plans belonging to the Farquhar interests were acquired by the Sindicato de Sucre, under the management of Sr. Ricardo Arco.

Sr. Lavadenz again went to Europe and approached Dutch oil interests in regard to taking over the rights that Mr. Farquhar had been forced to abandon. The Dutch company also sent out engineers and made preparations for taking out the oil through Argentina. The projects of this company fell through, largely as a result of disagreements with the Argentine Government.

At this point a group of Chileans made overtures to Sr. Lavadenz, and as a result there was created in 1916 the Comunidad Petrolifera Santa Cruz de Bolivia. This combination marked the entrance of the Chileans into the Bolivian field, and they remained the most important element in the situation until the advent of American interests. The Chileans agreed to pay £40,000 (\$195,000) in cash to Lavadenz, besides 2 bolivianos for each ton of oil taken out. A commission headed by Srs. Koning, Lanas, and Poloch went into the Santa Cruz district and made an extended reconnaissance of the properties of the company, but the Chilean interests lacked the capital to prosecute the work beyond this initial stage. Sr. Lanas was, however, able to prolong the life of the company and to make a combination with other parties interested in Bolivian oil. The most important other oil in-

terest at that time (1916-17) was the Comunidad Poderosa de Chuquisaca, which was organized early in 1916 by Jorge Cervero A. and Alfredo Bonilla Rojas. This company held rights over 700,000 hectares, situated in the Department of Chuquisaca. At the same period other concessions were held as follows:

Name of property.	Number of hectares.
Lagunillas.....	400,000
La Blanca.....	500,000
Porvenir.....	400,000
Sindicato de Sucre.....	66,000
Pioneer.....	80,000
Ayacucho.....	49,000

The subsequent acquisition of most of these properties has constituted the basis for the movement of American capital into this field, the Chileans retiring to the western part of the country.

The Chilean interests that accumulated such large holdings in the Santa Cruz district turned their attention later to the Caupolicán and Calacoto zones. In those regions they acquired titles to, respectively, 127,400 and 5,000 hectares. They were never able to gain a complete title to the 400,000 hectares comprised in the Victoria property. Seven thousand hectares which were included in the three fields known as Asangaro, Huancone, and Pusei (the last-named across the Peruvian border) formed the basis of a company which bears the name of the Compañía Petroleco España. This smaller company has a paid-up capital of £40,000 (\$195,000) and has already begun operations on a small scale. Early attempts to develop the Caupolicán region, dating from 1906, failed. In 1916 Sr. Hiram Loayza, a Bolivian, secured an option on 25,000 hectares, under the name of Santa Doris Compañía Petroleco de Caupolicán, but failed to carry out the conditions of the contract within the specified time and was compelled to renounce his claims. However, Sr. Bonilla Rojas was able to make good the rights to 127,400 hectares, which was to form the basis of the Chilean Comunidad Caupolicán.

Several concessions were obtained in the Calacoto region in the Province of Pacajes before the law of 1916 prohibited further grants of oil lands. The following companies have been organized to work these properties.

Name of company.	Number of hectares.
Unión de Calacoto.....	5,000
Preliminar de Calacoto.....	3,473
Bolívar y Sucre.....	430
Progreso.....	500
Remedio de San Antonio.....	90
Copacabana.....	30

LOCATION OF OIL FIELDS.

The Bolivian oil fields are but one link of a petroleum belt which continues on the south into Argentina and on the north, with wide gaps, into Peru and beyond. The presence of oil has long been noticeable in numerous places among the lower foothills of the eastern side of the Andes, where seepages appear in the presence of the marked anticlines of that region. Such manifestations have been most evident in the country lying to the west of the Santa Cruz-Yacuiba trail. In fact, the Santa Cruz-Chuquisaca-Tarija oil dis-

trict follows the general direction of this trail, which parallels the adjacent foothills of the Cordillera. North and northwest of the city of Santa Cruz, evidences of oil continue in frequent seepages. The natives have long been accustomed to bale out oil from the holes for local use, and the street lamps in Santa Cruz have used the local oil. From this region the general direction of the fields is toward the northwest, roughly paralleling the main chain of the Andes and the coast of the Pacific. Though the presence of oil has been discovered in the Beni, it is nowhere so common in that region as in the Province of Caupolicán, which lies in the Department of La Paz and to the west of the River Beni. In this zone it has been found in several localities between the valley of the Tuishi and that of the Madidi.

The exception to this larger field, which extends with breaks from the neighborhood of the Madidi almost to the Argentine border, is that of Calacoto. This minor field is located in the Province of Pacajes, Department of La Paz, and along the line of the Arica-La Paz Railway. It lies at an altitude of over 12,000 feet and in a country of different geological characteristics. It is situated near the Mauri and Desaguadero Rivers, which belong to the curious drainage system of Lakes Titicaca and Poopo.

BOLIVIAN LAWS REGARDING PETROLEUM LANDS.

LAW OF DECEMBER 12, 1916.

The principal provisions of the law of December 12, 1916, were as follows:

1. For three years following January 1, 1917, holders of oil lands were to pay a yearly tax of but 2 centavos per hectare, but for the two succeeding years this tax was to be raised to 10 centavos per hectare, in both cases to be paid half-yearly. If half the tax were not paid before the end of the corresponding half year, the concession in question would be declared annulled.

2. The State reserved to itself 10 per cent of the gross proceeds of all petroleum workings.

3. From the date of promulgation of the law further grants of petroleum lands were forbidden, such lands to be the exclusive property of the State. Concessions which should be annulled or whose grantees should be dispossessed were also to pass into the possession of the State.

4. Any mineral oils which might be found in connection with the working of other mineral concessions were likewise to be the exclusive property of the State.

5. The product of the tax collected in accordance with this law was to be devoted to the construction of the railway from Sucre to Santa Cruz by way of Lagunillas.

LAW OF FEBRUARY 6, 1920.

The provision in section 1 of the law of 1916 regarding the payment of a tax of 10 centavos per hectare on oil lands is amended by the law of February 6, 1920, so as to provide for the reduction of this tax to 8 centavos per hectare.

LAW OF FEBRUARY 24, 1920.

By the law of February 24, 1920, the President of the Republic is authorized to grant a concession for the working of petroleum deposits located on fiscal lands. Such concessions are to be in the form of a

temporary lease and are not to exceed 66 years. The State is to receive, as its share of the gross product of such workings, a proportion of not less than $12\frac{1}{2}$ per cent. The State itself is also authorized to proceed with the exploitation of such deposits by direct administration. In such a case it may contract a loan for the amount needed, providing as guaranty the oil lands in question and the machinery to be required for this purpose.

Twenty per cent of the net profit resulting from the working of petroleum deposits on fiscal lands is to be paid into the treasury of the Department in which the workings are located.

INTERESTS IN FIELD.

AMERICAN.

RICHMOND LEVERING & CO.

The home office of Richmond Levering & Co. is at 120 Broadway, New York.

Their acquisitions by private purchase, and options held on private lands, total nearly a million hectares, distributed as follows:

1. *Santa Cruz-Chuquisaca-Tarija region*.—About 200,000 hectares, chiefly in the property known as "Porvenir" lying northwest, west, and southwest of the city of Santa Cruz. (Julio C. Alberta has recently gone to the United States with full powers from Miguel Velasco to "modify, annul, or rescind the contract made with Richmond Levering & Co." for the options on the "Porvenir" property.) The Richmond Levering interests have also been negotiating with the owners for options on an additional 200,000 hectares in the Santa Cruz region, included largely in the property known as "La Previsora," and in other properties known as "El Campamento," "El Carmen," "La Esperanza," and "Central."

Five hundred thousand hectares in the Departments of Chuquisaca and Tarija. The largest block of this lies to the east and south of the Braden properties as far as the Argentine border, and an additional piece lies as a long, narrow strip between the "Poderosa" and "Lagunillas" properties in Braden. This is probably the most valuable part of the Richmond Levering holdings.

2. *Colonias region*.—Richmond Levering & Co. have also secured rights to 100,000 hectares in the Territory of Colonias, lying to the west of the River Beni and to the north of the Madidi.

3. *Calacoto region*.—Five hundred hectares included in the "Progreso" property.

Richmond Levering & Co. have also secured the oil rights to 1,000,000 hectares of fiscal lands under the provisions of the law of February 24, 1920. They have the right to select these lands in the Departments of Santa Cruz, Chuquisaca, and Tarija.

ARGENTINE-BOLIVIAN EXPLORATION & DEVELOPMENT CO., BUENOS AIRES.

The William Braden interests have acquired private concessions in the Lagunillas field amounting to 2,145,000 hectares. These cover the properties known as "Santa Cruz," "Poderosa," "Lagunillas," and "La Blanca," and were secured for £750,000 (\$3,649,875) from the Chilean and Bolivian interests which held the original titles to them. The most promising of the Braden holdings are situated in the

Province of Azero. One Braden engineer declares that these are "the richest deposits in the world." Probably the least valuable of the Braden properties is "La Poderosa."

A party of Braden men has recently gone into the Lagunillas field from Sucre for the purpose of making surveys.

SINCLAIR & CO.

Though this company had a representative in Bolivia for some time, it appears to have been unable to obtain the concessions necessary for operating in the country. It has, however, been competing with Richmond Levering for options on certain oil lands.

BRITISH.

J. BACKUS.

J. Backus is general manager of the Bolivia Railway, with offices in La Paz. Though not legally a British citizen, his business and social connections are largely British.

Mr. Backus holds a concession from the Bolivian Government, similar in its main details to that held by Richmond Levering for the Departments of Santa Cruz, Chuquisaca, and Tarija, and covering the Provinces of Pacajes, Camacho, Munecas, and Caupolican in the Department of La Paz, while he has also presented a similar petition for a concession to cover the Department of El Beni. He holds these concessions as an individual, but has given the Bolivia Railway Co. until April 15 to take over his rights. Mr. Backus does not command the capital necessary to develop the lands included in his concessions for oil rights on fiscal lands, but it is believed that he is counting upon the Pearson interests to furnish this element in his plans.

ANGLO-SOUTH AMERICAN OILFIELDS (LTD.).

The home office of the Anglo-South American Oilfields (Ltd.) is at 24 College St., London, E. C. This company is capitalized at £250,000 (\$1,216,625), which is divided into 500,000 shares of 10s. each. Of these, 249,986 shares have been issued as fully paid up for the property acquired by the company. The Brazilian Commerce & Industries (Ltd.) hold the shares in question and now offer them for resale at the same price through their bankers, the London Joint City & Midland Bank.

This company has leased 750,000 hectares of land in the Department of Santa Cruz from the Anglo-South American Oil Co. These lands lie in the Province of Velasco between latitude 13 and 14 and longitude 61 and 62.

CHILEAN.

The Compañía Petrolífera Caupolican y Calacoto, with home office at Calle Bandera 231, Santiago, Chile, has a capital of £600,000 (\$2,919,900), divided into 1,200,000 shares of 10s. each; 496,000 of these shares belong to the former shareholders of the two companies whose amalgamation constituted the present company, namely, the Compañía Petrolífera de Hulluncayani and the Compañía Unión de Calacoto.

In the Calacoto district the company holds 5,000 hectares, which formerly belonged to the Compañía Unión de Calacoto.

In the Caupolican district the company holds 127,400 hectares in the country about the River Tuichi, an affluent of the Beni. It is also negotiating with J. Backus for more lands in the same general region.

TRANSPORTATION PROBLEMS.

Calacoto field.—The transportation problem for this district is greatly simplified by the nearness of the Arica-La Paz Railway.

Caupolican field.—Oil from this field would have to be taken out by way of the Beni, the Madeira-Mamore Railway, and the Amazon.

Colonias field.—The Richmond Levering people consider the laying of a pipe line from this field to Cobija, where the Rio Acre is navigable for large steamers.

Beni and Upper Santa Cruz fields.—Any oil found in these regions will be sent out through the Amazon tributaries and over the Madeira-Mamore Railway into the Amazon.

Santa Cruz-Chuquisaca-Tarija fields.—Richmond Levering & Co. propose to take out oil and bring in machinery and supplies across the Chaco, with Puerto Pacheco (Bahia Negra) as their base on the Paraguay River. They would run a road across the Chaco almost due west from Puerto Pacheco, with artesian wells at regular intervals. They contemplate the use of tractors, especially in the initial stages of the work. Their pipe line would be laid along this same route. The alternative to this is the old road south from Lagunillas and Santa Cruz to the Argentine railhead at Embarcacion. For the field which lies to the west and northwest of the city of Santa Cruz, the transportation problem is extremely difficult, not only because of the great distance from either the Paraguay River or the terminus of the Argentine Central Northern Railway, but because of the mountainous character of the country itself.

Braden's plans include the construction of a railway from Sucre to the Pilcomayo River at some point between the small forts of Magarinos and Esteros, which would enable him to send out his oil through the Parana River by the Argentine port of Formosa. Such a line would pass through the towns of Villa Montes and Machhereti and would keep to the north side of the Pilcomayo as far as the point to be designated for the place of crossing. Here it would make connections with a branch of the Argentine State railway that is being built in from Formosa with Embarcacion as its ultimate objective.

It may be added here that schemes for piping petroleum from the eastern Bolivian fields across the Andes to Chile are entirely impracticable, as this would imply raising the oil a height of about 13,000 feet, and petroleum is also too heavy to be siphoned across. The natural and easy gradient from the fields to the River Plate fluvial system makes this the logical outlet for the Bolivian oil fields.

STOCK RAISING.

INTRODUCTION: LIVE-STOCK STATISTICS.

Though stock raising is widely carried on in Bolivia, the industry is in much the same backward state of development as is agriculture. The greatest need in the country at present is the introduction of better breeding animals from abroad. However, a beginning is being made on a small scale in the importation of high-class boars and rams from the United States. Stock is raised in considerable numbers on the altiplano, but the part of the Republic best suited by nature to the industry consists of the plains that extend from the Yacuma region of the Beni south to the Chaco lowlands along the lower Pileomayo.

Not even an approximate estimate of the number of live stock in Bolivia is possible, but the National Ministry of Agriculture is now preparing such a census on the basis of data sent in by local officials throughout the country.

The data collected by the middle of 1920 covered only a few Provinces of the Republic. Some of the results were as follows:

Department of Cochabamba: Provinces of Arque, Ayopaya, Campero, and Totora—		
Cattle.....	75,811	
Sheep.....	260,207	
Goats.....	50,442	
Hogs.....	10,852	
Department of Santa Cruz: Provinces of Cordillera and Chiquitos—		
Cattle.....	39,202	
Sheep.....	2,775	
Goats.....	2,939	
Department of Tarija: Provinces of Gran Chaco and Ayiles—		
Cattle.....	21,597	
Sheep.....	82,779	

A census made in 1912 of the live stock in the Provinces of Tomina, Yamparaez, and Cinti, Department of Chuquisaca, by the National Department of Statistics gave the following results:

Cattle.....	113,679	Burros.....	21,657
Sheep.....	200,782	Goats.....	89,118
Mules.....	9,115	Hogs.....	23,697

However, the Province of Azero has more live stock than any one of these Provinces. A Government veterinary surgeon gave the following figures in 1919 for the live stock of the three Provinces of Cercado, Mendez, and O'Connor, Department of Tarija:

Live stock.	Cercado.	Mendez.	O'Connor.
Cattle.....	1,705	9,420	20,000
Horses.....	1,009	3,009	9,307
Mules.....	173	652	1,019
Burros.....	655	1,552	1,750
Sheep.....	17,050	39,985	21,611
Goats.....	11,900	20,335	11,380
Hogs.....	910	8,165	10,020

A census of the Province of Cercado, Department of Oruro, taken in 1914 by the departmental government, gave the following results:

Horses.....	59	Sheep.....	149,625
Mules.....	49	Llamas.....	33,446
Burros.....	5,231	Alpacas.....	217
Cattle.....	5,446	Goats.....	103

A census taken of the Provinces of Cercado and Sicasica, Department of La Paz, in 1910, gave the following results:

Live stock.	Cercado.	Sicasica.
Sheep.....	38,712	67,998
Cattle.....	8,816	2,392
Mules.....	1,117	303
Hogs.....	1,224	1,049

CATTLE.

The breed of cattle in Bolivia largely consists of the degenerate descendants of the old creole stock of Spanish times. Through lack of care and unrestricted interbreeding this race of cattle has steadily deteriorated, and to-day a typical steer of this variety will weigh, dressed, only 400 to 450 pounds. They are the long-legged and long-horned cattle everywhere common to this class of animal. Some of the stock bred for oxen attain to a good size and weight, and though they are often slaughtered for beef after a long period of service, their flesh has acquired a consistency that scarcely makes it prime meat for eating purposes.

PLATEAU REGION.

It is unfortunate that in Bolivia the lands best adapted to the raising of cattle are situated in the eastern part of the country, being thus far distant from the chief centers of population on the plateau. However, most of the demand of the plateau cities is supplied by cattle bred on the altiplano, though considerable numbers are brought to Oruro, Potosi, and Uyuni from the valleys about Cochabamba and Sucre. Most of the estates of the La Paz section of the table-land raise a few head, but there are no large herds in that region. There is not sufficient pasturage for large numbers of cattle, except in certain parts of the Province of Carangas, where there are large tracts of grassy country bordering the streams of the Desaguadero-Poopo system. The growth of scrub grass which covers much of the table-land furnishes adequate grazing for the limited herds during the rainy season, but the feeding problem may become serious during the dry months, when the altiplano takes on a brown and parched aspect and the streams have run dry. Little alfalfa or other forage is cultivated as food for cattle.

REGION OF COCHABAMBA.

In the more temperate region of Cochabamba stock raising ranks next to agriculture among the industries of the Department. The extent of pasture lands is restricted, however, and herds are small, there being seldom more than 200 or 300 in a lot (and even herds of

this size are rare). Difficulties of communication with the plains country to the northeast, which is well suited to cattle raising on a large scale, are such as to prevent the bringing of cattle from that region to the Cochabamba market. The cattle raised in the Beni are consumed locally, sent down river into Brazil, or driven via Santa Cruz south into northern Argentina, particularly to Salta. Those animals killed in the "mataderos" of the towns in the Department of Cochabamba are mostly old oxen that have outlived their usefulness as draft animals, or are steers that are too small for draft service. Some cattle are also brought in from the Vallegrande district, which lies a long way to the southeast of Cochabamba. Very few are driven in from the region about Santa Cruz.

Weekly cattle fairs are held in nearly all the towns about Cochabamba, as well as in the capital itself. The largest of these cattle markets is that of Quillacollo, to which about 500 head are brought each week, as against about 400 for the Cochabamba market. However, only a few of the animals are sold, the unsold majority being driven back to the country, to be brought in again to the next week's market. Prices for this class of stock, which weighs from 400 to 450 pounds, dressed, range between 100 and 200 bolivianos. It is reported that 55,677 head of cattle were killed in the public "mataderos" of Cochabamba during the eight-year period 1911-1918. During 1919 there were killed 7,300 cattle, 34,303 sheep, and 4,384 goats. The hides of all cattle killed within the city are required to be turned over to the municipality, which auctions off to the highest bidder the right to sell them. However, because of the prevalence of the foot-and-mouth disease in the Department, the quality of the Cochabamba hides has deteriorated considerably of late. Little attention is paid to dairying, and the native breed of cattle, moreover, yields milk of poor quality.

SUCRE DISTRICT.

Though the area of grazing lands in the mountainous country of the Sucre district is limited, a surplus of cattle is raised for shipments to other parts of the country. Excellent oxen are bred in this region. Owing to the lack of pasturage, there are almost no cattle in the Yungas country, and meat is brought in, dried, from La Paz. An experiment of bringing cattle from the Beni failed because of the great distance over which it was necessary to drive them.

BOLIVIAN AMAZONIA.

There are vast areas of land in the Bolivian Amazonia that are suited for the raising of cattle on a large scale. The largest single extent of pasture lands is in the Mojos plains between the upper Beni and the Mamore, although there are also wide expanses of open country in the Itenez district. These plains are covered with a luxuriant growth of grasses, and there is generally a plentiful supply of water throughout the year.

The stock of cattle in the Mojos region is variously estimated at from 250,000 to 1,000,000 head. These consist of the old creole breed which is so common in the more undeveloped parts of South America. There are also large numbers of wild cattle, or "ganado bravo," which graze on the prairies in the neighborhood of the forests.

into which they escape when pursued. However, cattlemen are making an effort to domesticate these wild herds, which belong to anyone on whose lands they may happen to be at a particular time. There are seldom more than a few hundred head of cattle in the herds of tame stock, though there are some herds of 5,000 to 7,000.

One of the principal difficulties in raising cattle in the Beni arises from the periodical inundations of wide expanses of the plains on which the herds graze. However, there are generally rises of ground within reach to which cattle can be driven above the level of the floods, and, moreover, the depth of water on the open prairies is seldom great enough to cause losses from drowning. Much could be done, too, by ditching parts of the land, so that the water could flow off more quickly. The lack of salt is another problem that faces the "ganaderos" of the Beni country, and rock salt has to be brought in from the Oruro and Uyuni districts of the plateau. The "fiebre aftosa" or hoof-and-mouth disease has caused considerable damage to cattle in the Beni, though a remedy devised by a German chemist in Cochabamba has been tried with success. Some cattle are killed by jaguars, but more are probably lost as a result of bites by poisonous snakes.

Improved methods of breeding are greatly needed in the Beni, as everywhere in Bolivia. There is little selection of breeding stock, and no foreign bulls have been introduced. Because of the lack of care of the herds an abnormal percentage of the calves die each year. The wiring of pasture lands is unknown.

The lack of a larger market has been one of the great obstacles to the development of the cattle industry in the Beni. The cattle country of the Mojos region supplies the rubber districts along the lower rivers with beef on the hoof or in the dried form as "charqui," but this is a very restricted market. Buyers from the Argentine also come north each year by way of Santa Cruz and drive back from 1,000 to 3,000 head of cattle. Some are sent across into Brazil, and in 1917 one lot of 40 was shipped as far as Para with good results. The export duty on cattle is, respectively, 12 and 15 bolivianos for male and female stock. There is also a duty of 2 bolivianos on each hide shipped out of the Department of El Beni. Most of the hides exported from the Department are sent to Cochabamba. A few years ago cattle in the Beni sold for 5 to 10 bolivianos a head, but they now bring up to 100 bolivianos.

One of the most serious needs of the cattle business in this region is improved connections with the large market of the plateau, which would enable cattlemen to place their stock in Cochabamba. At present the lack of food in the heavily forested country that intervenes between the Chapare plains and the mountains which hem in the Cochabamba valleys on the north makes the driving of cattle over the Todos Santos trail out of the question. The only alternative route is the roundabout way by Santa Cruz and Totorá. This would necessitate the establishment of feeding grounds at regular intervals along the road, and, even with this precaution, losses would inevitably occur. In 1920 a representative of American packing interests visited the Beni and Santa Cruz regions with the object of studying the conditions of the cattle industry in that region and the possibilities of bringing cattle thence to Cochabamba, where the establishment of a packing plant was considered. A road is also

being built from the Borja plains of the western part of the Rio Beni Basin to Coroico in the Yungas for the express purpose of bringing cattle to the plateau in the region of La Paz. This is a private enterprise in charge of a German.

DEPARTMENT OF SANTA CRUZ AND REGION TO SOUTH.

Stock raising is at present the most important industry of the Department of Santa Cruz. In the plains country there are wide areas of lands covered with high grass, on which large herds of cattle feed. In the Chiquitos region to the east herds are smaller, but the pasture lands are sufficient to accommodate a far greater number of cattle. Parts of the Beni and the northern Provinces of Argentina are the only outside markets for the cattle of Santa Cruz, and it is the limited capacity of this market that constitutes the principal impediment to the expansion of the industry. It is impracticable to drive cattle in any considerable numbers over the mountains to Cochabamba. Large numbers of hides are, however, sent to Sucre and Cochabamba as sole leather. The breed of cattle is still comparatively small and of late has suffered much from hoof-and-mouth disease. A large proportion of calves also die from the blowfly. With the present lack of incentive, little is being done toward improving the breed of stock.

The cattle region of eastern Bolivia continues south from Santa Cruz in the belt lying to the east of the Andes foothills and extending down into Tarija and thence southeast into the Chaco country along the lower Pilcomayo. There is much good pasture in this region, especially in the Tarija valleys and along the Pilcomayo. There are several large properties in this area. The Leach Bros. estate of La Esmeralda on the Pilcomayo has more than 5,000 head of cattle, and the German firm of Staudt & Co. has 17 ranches in the neighborhood of Villa Montes. They have wired "potreros" or pastures, and have dug a number of wells 8 to 30 meters (26 to 98 feet) deep. There is considerable cattle stealing in some parts, and it is estimated that about 17,000 head are driven across the lower Pilcomayo into Argentina each year for the purpose of escaping the payment of the export duty. In 1918, 14,253 bulls and steers and 522 cows were exported through Yacuiba into Argentina, and in the first four months of 1919 exports amounted to 3,761 bulls and steers and 112 cows. A certain amount of Texas fever, hoof-and-mouth disease, and carbuncle is prevalent in this region.

EXPORTS AND IMPORTS.

During 1918 a total of 17,114 head of cattle were exported through the Bolivian customhouses. These cattle represented an official value of 1,540,260 bolivianos. The proportion shipped to Argentina, Brazil, and Chile was, respectively, 86.51, 9.72, and 3.77 per cent. Between 1911 and 1918 exports of cattle increased by over 667 per cent. Exports by Departments were as follows: Santa Cruz, 7,577 head; Tarija, 3,967; Chuquisaca, 3,384; El Beni, 1,425; others, 761. During the same year 3,852 head of cattle were imported, most of them from Argentina by way of Villazon; and 1,913 head were driven through Villazon on their way across to Chile. In 1919, 20,600 cattle, valued at 1,854,000 bolivianos, were exported.

In 1918, 484,867 kilos of hides, to a value of 387,893 bolivianos, were exported. Tarija, Chuquisaca, La Paz, and Santa Cruz were the largest shippers, in the order given. The proportion sent to the different importing countries was as follows: Great Britain, 51.12 per cent; United States, 25.05 per cent; France, 14.90 per cent; and the remainder to various South American countries.

Imports of canned and prepared meats of various kinds amounted to 31,375 kilos, with a value of 29,565 bolivianos. In addition, 70,721 kilos of "charqui" or sun-dried beef was imported. The largest imports of meat products were from Brazil and Chile. Of condensed milk, 817,472 kilos were imported, to a total value of 245,242 bolivianos, of which 642,497 kilos came from the United States, Peru ranking second. Of butter, 66,063 kilos were imported, largely from Peru, Argentina, and Denmark, though 3,693 kilos were imported from the United States. Imports of cheese amounted to 22,728 kilos, mostly from Chile and Argentina.

SHEEP AND OTHER WOOL-BEARING ANIMALS.

In spite of the adaptability of much of the country to the raising of wool-bearing animals, the development of the foreign wool trade of Bolivia is of quite recent date, only about 17,000 kilos of sheep's wool having been exported in 1910 and 1911. Though there has been a very marked increase in the exports of wool during the past decade, much remains to be done before the sheep-raising industry is put on such a modern basis as it has reached in countries like Argentina and Uruguay.

SHEEP.

Though sheep are found throughout the highland region of Bolivia, little serious attention is given to their breeding. The stock consists of the old degenerated merino breed brought in by the Spaniards and allowed to increase and deteriorate with what little care the Indian shepherds are disposed to give to their flocks. These flocks vary in size from a few sheep to 8,000, flocks of the latter size being very rare even in the Department of La Paz, which is the center of the sheep-raising industry of Bolivia. There is ample pasturage and water over large areas of the upland departments to support many times the number of sheep now grazing there.

The wool taken from these sheep is short, the clip from each animal averaging little more than 2 pounds of washed wool. The sheep are generally sheared once every two or three years. A sharpened piece of glass or tin is used for the operation, and the natives refuse to adopt the use of shears. A lot of a hundred shears, which were brought into the country a few years ago, found no sale, even though the importer made a personal demonstration of their use.

LLAMAS.

There are probably half a million llamas in Bolivia, where they constitute the traditional pack animal of the Indian population. They are sheared at intervals of from two to five years, though many are never sheared until after they are dead. When sheared every two years, each llama gives about 5 pounds of wool. The wool is somewhat coarse and is very dirty, the natives employing it very widely in their weaving. Llama wool brings about the same price in Bolivia as unwashed sheep's wool.

ALPACAS.

There are probably about 200,000 alpacas in Bolivia, though no effort has ever been made by the Government to take a census of either the alpacas or the llamas in the Republic. The animal belongs to the same family as the llama and the vicuna, but its legs are shorter than those of the llama. The alpaca flourishes only in certain districts, the most favorable to its growth being the region about Lake Titicaca and the Province of Carangas in the Department of Oruro. The centers of the alpaca wool trade are Charana and Puerto Acosta. The former town lies on the line of the Arica-La Paz Railway at the point where it crosses the border into Chile, and serves as the outlet for the alpaca wool supply of the Carangas country. Puerto Acosta is situated on Lake Titicaca. The Bolivian Government has been desirous of stimulating the raising of alpacas, and a few years ago gave a concession for that purpose to an American named Thaumann. The Bolivian Wool Co., which was organized by Thaumann, was later acquired by the British firm of Duncan, Fox & Co., of La Paz, but nothing has been done to comply with the terms of the concession beyond the maintenance of a single alpaca on the property near Lake Titicaca, which was originally granted to the company. Most of the herds of alpacas belong to Indians, who give them little attention, but who at least understand the peculiarities of the animal and are able to domesticate it. A more careful study of alpaca raising has been made in the Arequipa district of Peru than has been made in Bolivia.

It is customary to shear the herds every two years, though many are sheared at much longer intervals—even of five years. About 10 pounds of wool is generally sheared from a single alpaca. The most common colors are the various shades of brown. Blacks are also common, but the white animals are much rarer. In addition to their use as material for clothing, rugs are made of alpaca skins. These rugs, which are used as bed coverings, sell for 100 to 200 bolivianos, depending on size and color. The alpaca is sometimes crossed with the llama, the wool of the hybrid animal being sold as alpaca wool. A small clip of alpaca wool was anticipated in Bolivia in 1920, since the Indians refuse to shear their herds when their crops are good.

WOOL TRADE.

Exports of wool from Bolivia for the period from 1911 to June, 1919, were as follows:

Years.	Sheep wool.		Alpaca wool.		Llama wool.	
	Kilos.	Bolivianos.	Kilos.	Bolivianos.	Kilos.	Bolivianos.
1911.....	16,956	12,264				
1912.....	17,017	11,490	17	17		
1913.....	21,350	18,679	1,670	11,010		
1914.....	31,798	25,438	21,912	71,736	1,199	3,359
1915.....	56,873	51,561	77,431	162,605	11,973	11,978
1916.....	101,110	91,269	99,497	208,913	11,116	35,553
1917.....	157,926	142,433	127,261	267,251	67,191	53,755
1918.....	725,557	1,139,102	191,806	311,975	116,571	198,513
1919.....	125,851	1,362,735	101,779	529,253	126,872	105,990

Exports by countries for 1918 were as follows:

Kinds of wool and countries of destination.	Kilos.	Bolivianos.	Percentage.
Sheep wool:			
United States.....	382,433	726,651	63.80
Great Britain.....	261,889	352,301	30.91
Chile.....	30,542	9,177	.81
France.....	28,543	28,543	2.51
Argentina.....	22,040	22,263	1.96
Peru.....	130	165	.01
Alpaca wool:			
Great Britain.....	102,788	242,492	72.66
Chile.....	79,686	69,315	20.27
United States.....	9,238	24,927	7.00
Peru.....	94	240	.07
Llama wool:			
Chile.....	53,418	40,965	20.63
Great Britain.....	51,710	81,341	40.97
United States.....	41,446	76,207	38.40

The export duty on sheep and llama wool amounts to 20 centavos per kilo, and for alpaca wool the duty is 30 centavos per kilo.

Imports of woollen goods into Bolivia are shown in the following tables:

CASHMERES.

By years.			By countries, 1918.	
Years.	Kilos.	Bolivianos.	Countries.	Bolivianos.
1914.....	45,043	156,542	Great Britain.....	262,687
1915.....	50,233	131,104	Peru.....	51,082
1916.....	40,917	118,655	Argentina.....	46,605
1917.....	108,518	275,426	United States.....	9,649
1918.....	168,190	403,875		

"BAYETAS" (BAIZES).

1914.....	252,632	654,815	Great Britain.....	163,806
1915.....	92,726	240,521	Peru.....	6,892
1916.....	102,278	254,923	Chile.....	2,509
1917.....	77,186	202,160		
1918.....	65,916	173,225		

WOOLENS, IN GENERAL.

1914.....	98,017	61,079	Argentina.....	10,512
1915.....	1,255	4,953	Great Britain.....	3,212
1916.....	12,940	32,559	United States.....	2,901
1917.....	8,946	17,291	Spain.....	2,442
1918.....	6,015	19,567		

WOOLENS MIXED WITH COTTON.

1914.....	75,650	161,421	Great Britain.....	7,852
1915.....	631	2,986	United States.....	699
1916.....	511	1,941		
1917.....	1,136	4,317		
1918.....	2,510	9,239		

HOGS.

The raising of hogs has been little developed in Bolivia, in spite of the fact that some regions, both on the altiplano and in the eastern plains country, are excellently adapted to them. They should do especially well in the region about Lake Titicaca, in the Cochabamba and Sucre districts, and in the Santa Cruz and Beni plains. Many of the hogs now raised run to bone rather than to meat, though the problem of feeding them should not be a difficult one. The natives are little accustomed to the eating of pork. In 1918, 137 hogs were exported to Argentina, and only 11 hogs were imported. Imports of lard in the same year amounted to 353,373 kilos, of which 181,191 kilos came from Brazil and 87,340 kilos from the United States.

GOATS.

Goats could be raised with great success in the "montaña" region, particularly in the Yungas, and in Chuquisaca and Tarija. Great numbers of them could pasture on the mountainsides of the Yungas, where at present the people suffer from the lack of a meat diet. In 1918, 400 goats were imported into the Department of Tarija from Argentina.

BURROS, MULES, AND HORSES.

Burros and mules are used in large numbers for pack-train work in Bolivia. Whereas most of the burros are bred within the country, the majority of the mules used are brought in from northern Argentina. There is an excellent opportunity for the breeding of mules in Bolivia in such districts as the Mizque Valley, southeast of Cochabamba, and in some parts of Santa Cruz, Chuquisaca, and Tarija.

Little attention is given to the raising of horses in Bolivia. They do not thrive on the high altiplano, and in the plains country they suffer from the disease known as "mal de Cadera" or "peste de lomo," which attacks the spinal cord and is generally fatal. They are little used for farm work, most of which is performed by oxen, and few are kept for riding, for which purpose the hardier and more sure-footed mule is everywhere preferred. However, a few hundred horses are used by the army. In parts of eastern Bolivia bullocks are much ridden. During 1918, 21,702 horses and mules were imported into Bolivia, the great majority of them coming from Argentina.

FUR-BEARING ANIMALS.

The principal fur-bearing animals of Bolivia comprise the vicuña, chinchilla, and fox. The vicuña, a wild member of the same family to which the llama and alpaca belong, is found among the mountains throughout the plateau country, though in diminishing numbers. It is much smaller than either the llama or alpaca and has a very fine, silky wool of a tawny color. It is hunted by the Indians, who either weave its wool into a very attractive poncho or use its skin for the manufacture of "colchas" or rugs, which are much sought after for bed coverings. These rugs, about 4 by 6 feet, now sell for 150 to 250 bolivianos each, depending on the part of the skin from which the piece is taken. Uyuni is the largest market for this and other classes of furs.

The chinchilla is found in the more remote parts of the Cordillera Occidental, from the Atacama country in the south up to the Province of Pacajes. Most of them, however, live in the region of Mount Tatasabaya, in the Province of Carangas, where a large area of ground is covered with large rocks, among which the chinchillas make their homes. In spite of the law prohibiting their taking, they are fast disappearing, being trapped by Indians (who understand their habits and know their haunts) and clandestinely exported. There have been a few projects to domesticate them on "chinchilla farms," but none of these schemes have been put into practice.

The animal known as the "chinchillon" is a member of the same family, as is the vizcacha, though their fur is inferior to that of the chinchilla. The chinchillon is smaller than the chinchilla, but the texture of its fur appears quite similar to the touch and has the same bluish-gray color, though shorter than the fur of the chinchilla.

The red fox is found in many parts of Bolivia, and numbers of the skins are sold in La Paz, especially by a German firm, which does a good business in skins and furs of various sorts.

AGRICULTURE.

GENERAL CONDITION OF THE INDUSTRY.

Agriculture has held a relatively unimportant place among Bolivian industries as compared with mining, to which everything else has been subordinated. In fact, in many districts farming conditions have improved little, if any, since colonial or even pre-Spanish times, and in some respects have positively retrograded from the conditions under the régime of the Incas. The attention of the leading whites has been largely given to mining, or to politics and the professions, and the agriculture of the country has been left almost entirely in the hands of Indian tenants. The Indian is not only impervious to any progressive ideas that would go to improve the agriculture of the country, but he lacks even the paternal direction which he received from his Inca overlords before the coming of the Spaniards. Until very recently the Government did next to nothing for the industry, and its efforts at present are entirely incommensurate with the needs of the country in this regard. A Ministry of Agriculture was created a few years ago and annexed to the Ministry of Public Instruction. However, the budget of 1920 provided only 453,440 bolivianos for the Ministry of Agriculture, as against 11,316,444 bolivianos for the army. This branch of the Government is at present under energetic and intelligent direction and is doing all within the power of its limited resources to improve the backward state of farming in the country.

As throughout most of South America, there are comparatively few small landed proprietors in Bolivia. Most of the land is held in large tracts by men of predominantly white or Spanish race. However, in certain districts there are scattered Indian landowners, and in some parts, as in the Province of Carangas, the communal system of land ownership still survives. Here the title to large areas has remained in the hands of the Indians, who jealously guard their rights to the land. The tenant or farm-labor class everywhere consists of Indians or low-caste cholos. The status of these tenants varies considerably from place to place. There is little positive ill-treatment of this class, though the major-domos who administer the estates in the absence of the owners may sometimes be guilty of abuses. The tenant turns over to the owner a certain proportion of the year's product, varying from one-fifth to one-third. He is generally free to dispose of his own share of the proceeds as he pleases. He also generally has his own "chacra" or small plot of ground, where he raises enough food to supply the needs of himself and his family.

Not only is the Indian farmer by nature impervious to suggestions for improving his farming methods, but he bitterly resents any attempt to change his traditional ways, even to his own manifest advantage. The Aymará of the La Paz region is particularly conservative in this regard. A few years ago a young landowner, who

had studied abroad, attempted to put into practice on his estate on the altiplano the modern method he had learned in a foreign agricultural school. However, his reforms provoked an uprising of the "indiada" on his lands and his own murder in his country house, which was destroyed by the infuriated Indians.

Yet there is an increasing tendency among the wealthier proprietors to send their sons abroad, especially to the United States, for an agricultural education. This realization of the value of applying modern scientific methods to an industry that is still generally conducted in medieval fashion is one of the most hopeful signs in contemporary Bolivian life. As a complement to this movement there is seriously needed a wider development of agricultural education within the country. At present this is confined to the agricultural school and experiment farm in process of formation near Cochabamba and to the rural normal schools like that at Sacaba. Though these institutions represent a splendid conception, they lack the equipment and teaching personnel required to enable them to render the needed service to the national agriculture. Moreover, the mass of the country population should be reached through a widespread system of rural schools, such as were created in the Philippines by the American administration.

AGRICULTURE ON THE "ALTIPLANO."

Generally speaking, Bolivia may be divided agriculturally into three zones—the altiplano or plateau, the Yungas or montaña, and the eastern plains. On the bleak altiplano, where agriculture has been carried on since prehistoric times, a surprisingly large area is under cultivation. The level plain of the great table-land lends itself well to the growth of the hardier cereals, such as barley. However, with improved methods and an extension of the farming area, the production could be greatly increased in this region. Much of this country could be plowed with tractors, though the high price of fuel oil is a serious obstacle to their use. It must also be taken into consideration that the high altitude—about 12,000 feet above sea level—requires a special type of engine in power machinery. In the plains of Carangas, which lie well to the west of the railway in the Department of Oruro, there are large tracts of land that could be put under cultivation and there are parts of it that could be irrigated for the raising of alfalfa. Much of this land is free from stones, whereas in other parts of the "meseta" it is often necessary to clear the ground of bowlders before cultivation is possible. Large sections of the altiplano are unsuited for agriculture because of the alkaline character of the soil, as in the vicinity of Oruro and of Uyuni, where the ground is highly impregnated with salt. Other parts are liable to inundations during the rainy summer season, the water standing too long to permit the maturity of crops before the coming of winter. Though during the winter months the days are generally warm and sunny, the nights are cold and the temperature often falls below freezing. Moreover, during this time of the year strong winds often blow off the cordillera and across the table-land, chilling the air and damaging crops.

The Indians who dwell in the mountains utilize all the land within reach for cultivation. Sometimes they will pick the stones off a

piece of ground, and use them to build an inclosure around the plot thus cleared, in order to protect their crop of barley against the wind and roving animals. In many places among the mountains the traveler will see patches of cultivated land high above the trail on the mountainside, where the slope is so steep that a foothold would scarcely seem possible. In one valley of the montaña region a native landowner facetiously remarked to the writer that corn was planted thereabouts with a shotgun fired from below and harvested from a rope ladder let down from above.

A census taken in 1914 by the prefectural administration of the Province of Cercado, Department of Oruro, will give an idea of the extent of agriculture in that part of the plateau:

Area of Province.....	hectares..	514,300
Area under cultivation.....	do.....	8,541
Value of land.....	bolivianos..	2,389,500
Income from land.....	do.....	259,592
Number of properties.....		100
Harvest for year:		
Barley.....	quintals..	141,250
Potatoes.....	do.....	78,902
Chuno (desiccated potatoes).....	do.....	39,687
Quinoa.....	do.....	7,893

DEPARTMENT OF COCHABAMBA.

CLASSES OF LANDS—AREAS CULTIVATED AND INCOME DERIVED.

Agriculture is most highly developed in Bolivia in the valleys lying below an altitude of 10,000 feet above sea level. The most advanced farming region is that of Cochabamba, which is essentially an agricultural country, mining occupying a comparatively unimportant place among the industries of the Department. The harvests of 1920 in this district were exceptionally large. In general, the agricultural lands of the Department of Cochabamba may be divided into four classes—mountain, valley, Yungas, and tropical lowlands. The first class consists of the patches of land on the sides and summits of the mountains, where the Indians grow barley and a few potatoes and quinoa—crops adapted to the rigorous climate of the higher altitudes. The second class of lands, on which most of the agriculture of the Department is carried on, consists of fertile valleys, where the extent of cultivable land and the conditions of soil and climate combine the elements favorable to an intensive farming development.

The Yungas region, lying between the highlands and the plains of the Beni, has been little developed, though its valleys are highly favorable to the cultivation of such plants as coffee, cacao, and tobacco. At present its principal product, and the only one to whose cultivation any attention is given, is coca, most of the output being chewed by the natives of the Department. Below the region of the Yungas the plains that stretch away to the Department of the Beni are adapted to the cultivation of sugar cane, cotton, and rice. However, agriculture at present in this area is largely limited to the fields about the Franciscan missions, cultivated by the Yuracare neophytes under the direction of the friars, but the results obtained even on this restricted scale have demonstrated the larger possibilities of the region.

FIG. 15.—PRIMITIVE MACHINE FOR CRUSHING SUGAR CANE.

FIG. 16.—THRASHING PEAS IN THE COCHABAMBA REGION.

FIG. 17.—COCA TERRACES IN THE YUNGAS, BEFORE HARVEST.

FIG. 18.—COCA TERRACES, AFTER HARVEST.

The total area under cultivation in the Department in 1919 was estimated at 2,605,982 hectares. The total income from this area, as computed for the purposes of levying the small land tax of the Department, was calculated at 3,195,783 bolivianos, or over \$1,000,000. Though considerable allowance must be made for this figure, in view of the purpose for which it was drawn up, even trebling the figure would give an absurdly small return for such a large area. The official figure would show an average income of less than \$1 an acre, yet as much as \$400 an acre is asked for some of the farming land in the valley of Cochabamba. The extent of cultivated land and the income from this land during 1919 in each Province was as follows, according to official data:

Provinces.	Estimated area under cultivation.	Income as given for assessment of land tax.	Provinces.	Estimated area under cultivation.	Income as given for assessment of land tax
	<i>Hectares.</i>	<i>Bolivianos.</i>		<i>Hectares.</i>	<i>Bolivianos.</i>
Punata.....	20,434	339,243	Quillacollo.....	39,554	739,015
Arani.....	39,725	221,514	Capinota.....	16,646	163,466
Chiza.....	11,513	169,941	Arque.....	27,158	125,385
Mizque.....	135,730	82,618	Tarata.....	70,376	309,737
Campero.....	894,647	101,050	Chapare.....	20,593	250,532
Totora.....	498,047	113,977	Cercado.....	14,780	264,968
Ayopaya.....	780,500	201,098			
Tapacari.....	39,179	103,240	Total.....	2,605,882	3,195,784

The highest returns are shown by the Province of Quillacollo, where irrigation is used on a large scale. The Provinces of Cercado (this Province comprising the environs of Cochabamba), Punata, and Chiza show a relatively high return from the land. The Province of Mizque, which contains some very fertile valleys, was formerly much more productive and prosperous than at present, its decline being largely due to the ravages of terciaria, or intermittent fever, which caused the decimation of the population and the emigration of many of the survivors to more healthful districts.

NEED FOR EXTENSION OF IRRIGATION.

The rainfall in the Department, as throughout Bolivia, is seasonal, most of it falling during the months from November to April, and little or none falling during the remainder of the year, especially in the winter months of June, July, and August. During the dry, winter season, the rivers shrink to small proportions, and some of the smaller streams dry up altogether. Though it is always warm in the sunshine, the temperature in the valleys about Cochabamba may fall to freezing during the midwinter nights. At this time of the year the country presents a dry and parched appearance except where irrigation is practiced.

Such streams as the Rocha furnish water for irrigating part of the land, and numerous small mountain torrents are canalized and led out across the fields in the valleys. Irrigation is used to the largest extent in the Quillacollo Valley, but it is also resorted to, as far as the available water supply will permit, in other valleys in the neighborhood of Cochabamba. However, it is probable that not more than 10 or 12 per cent of the cultivable area of these valleys is under irri-

gation. An extension of the irrigated area of the district would greatly increase production, and a company of engineers is now studying a large project for the irrigation of the Punata and Sacaba Valleys. These men, who are working under the auspices of the Bolivia Railway Co., are investigating the supply of water in the small lakes and lagoons in pockets in the surrounding mountains, particularly in the vicinity of Vacas.

RAISING OF CORN—MANUFACTURE OF "CHICHA."

Corn is the principal crop in the Cochabamba Valley. Both new seed and better methods of cultivation are greatly needed. Though corn generally grows to a good height, there is seldom more than one ear to a stalk, and the ears are rarely over 8 inches long. However, the grain is usually large. As the corn is planted at intervals of 6 to 10 inches, the field can be plowed only one way. The price of corn varies during the year between 6 and 12 bolivianos per Spanish quintal. The crop for 1920 in the immediate district of Cochabamba is estimated at about 500,000 quintals.

Probably 75 per cent of the production of corn is used in the manufacture of "chicha," the native drink made by a process of fermentation. There are more than 1,500 chicha-making establishments in the Department, most of which operate on a very small scale. Within the municipal limits of Cochabamba there are almost 1,400 "chicherías," or places where "chicha" is dispensed. These are nearly always run by women, who pay an annual license of 5 bolivianos to the city government. The drink, which has a muddy, yellowish-brown appearance and the taste of bad cider, is more or less intoxicating, depending largely on the degree of fermentation. Though normally little drunkenness results from chicha drinking, over-indulgence on the occasion of the frequent feast days leads to widespread intoxication in the community.

The corn that is not consumed in the making of chicha is ground into flour or used for feeding stock. The possibilities of corn as an article of diet for man have been little developed, and the food value of corn bread is little appreciated.

WHEAT PRODUCTION—POSSIBILITIES OF FLOUR-MILLING INDUSTRY.

Wheat of good grain and head is produced in considerable quantity, though the production per acre is not large. The wheat crop is harvested with the sickle and thrashed by driving oxen over the straw. Though most of the wheat is ground in the Department, some of the crop is sent to other points in Bolivia. There are numerous small flour mills, located near the base of the mountains, where the water power from mountain streams is utilized to operate a stone burr. The most modern mill in the Department is that of the Empresa Luz y Fuerza, which is situated within the city of Cochabamba. There is one other mill of a similar character. The flour made by the smaller concerns is coarse, and some of it contains a fair proportion of bran. Except in the case of the better-grade flour produced by the two modernly equipped mills, the local product is mixed with imported Chilean flour. There should be a good field for flour milling on a large and modern scale in the locality of Cochabamba, where sufficient water power is available and where

the area sown to wheat could be greatly increased. The price of wheat ranges from 10 to 14 bolivianos per quintal. Imports of flour and wheat from Chile alone during 1918 amounted to, respectively, 13,806,775 and 318,575 kilos, having a total customs value of about 2,230,000 bolivianos. It is understood that a British importing firm plans the establishment of a large flour mill in Cochabamba.

LARGE ACREAGE OF BARLEY—OTHER PRODUCTS.

Barley is grown not only in the mountains, where no other cereal will grow, but also in the valleys, where the total acreage planted to it is large. Almost the entire production is consumed in the making of beer and alcohol, though the straw is widely used for feeding stock. Barley brings from 6 to 11 bolivianos per quintal. During 1919 there were manufactured 23,092,000 liters of alcohol from cereals, both barley and wheat, in the Department of Cochabamba, while about double this amount was made from sugar cane.

Oats are grown, but to a much smaller extent than either wheat or barley. Quinoa, a hardy cereal with a small, round grain, is raised on very limited areas, and since animals will not touch the plant, it is grown around cornfields to keep out roaming stock. The grain makes a nourishing soup.

Sugar cane, which is grown in some of the lower and warmer valleys in the eastern part of the Department, is used in the manufacture of alcohol. The area which could be planted to cane in the tropical lowlands is almost unlimited. Sugar beets should also do very well in the valleys about Cochabamba.

Potatoes are the most important vegetable grown and, though of good flavor, are of small size. Sweet potatoes, squashes, onions, radishes, beets, peppers, and a few native vegetables, such as oca, are raised, but the market gardening shares in the general backwardness of agriculture in this district.

FRUIT GROWING.

The same backward condition prevails as regards fruit growing. The region of Cochabamba is well suited to the raising of a wide variety of fruits, especially with a larger use of irrigation, but under the present system orchards are left uncared for, with the natural result that the trees and fruit deteriorate. Pruning is almost unknown, but fortunately pests are not common, so spraying is seldom necessary. The results obtained on a small experimental farm in Sacaba, where some fruit of excellent quality is grown, have shown the fruit-culture possibilities of the Cochabamba region.

The grapes grown in the valleys around Cochabamba, though generally sweet, are small and of poor appearance. About 20,000 liters of wine are produced yearly by one firm at Muyurina. However, this wine is still of inferior quality, and considerable quantities of adulterated Chilean wine are imported for the local market. Peaches, which are the fruit most widely grown, are small and of very poor quality, as are also the apples and pears raised in this locality. Oranges do well even without any care being given to the trees, and the fruit is juicy and of good flavor, though small. Figs and several tropical fruits peculiar to South America, such as the chirimoya, are also found in all the Cochabamba valleys.

PRIMITIVE AGRICULTURAL METHODS.

Though this region is the most highly developed agricultural district in Bolivia, its superiority in this respect is only relative, for agriculture here, as everywhere in Bolivia, is in a backward state. The position which Cochabamba holds in relation to the other Departments is largely due to the superior natural conditions found there. The natives, when left to themselves, usually farm as in the days of the Incas. The "estanciero" is too generally content with the income which the traditional methods bring in to improve these, while in many cases he spends too large a part of the year at his city residence to give proper attention to the direction of his "finca" in the country. Moreover, the major-domo who manages the farm in the owner's absence often has little, if any, better idea of modern farming than have the Indian peons. The same crop is grown on the same ground year after year without recourse to either fertilizers or rotation.

The farmer gets along with a minimum of tools and implements, and these are usually of the pattern used by his ancestors for generations. They consist of a heavy hoe, a sickle for harvesting grain, and a rude wooden plow. A machete, generally of American make, is widely used for cutting corn. A light, one-handled iron plow, also made in the United States, is finding favor among the farmers of the region and can be had for 45 bolivianos. Agents for the plow recently sold more than two dozen in a week. There is no market for heavy plows. One importer who brought in some large riding plows, requiring about five mules to pull them, was unable to make a sale.

PROSPECTIVE MARKET FOR SIMPLE AGRICULTURAL MACHINERY.

There is little or no demand for tractor plows and tractors in general, even though the Cochabamba valleys are well suited to their use. In addition to the high original cost of tractors, fuel is expensive, and there are, moreover, few peons capable of operating or repairing them. In fact, in considering Bolivia as a market for agricultural machinery, the general lack of mechanical ability among all classes must be borne in mind. This factor makes simplicity a prime requisite in farming machinery. In case more complicated implements are sold, the agent must be able to show the farmer how to operate them.

There is no doubt that, if the proper methods were used, a considerable market for agricultural machinery could be worked up, in spite of the conservatism of the farmers and the cheapness of labor. This market should include such implements as disk harrows, corn planters, mowers, hayrakes, light hay presses, and even reapers, in addition to plows that can be drawn by a yoke of oxen. The best-equipped farming property in the Cochabamba district is located near Punata, and is fitted up with a complete line of modern American farming machinery, even to a thrasher; and though the inevitable difficulty of securing competent help to operate the implements has been experienced, the results have been, on the whole, very satisfactory.

FARMS WORKED BY INDIAN TENANTS.

In the tropical plains country the land is held in large blocks by a comparatively few owners. The actual work on the farms is performed by the Indian tenants. The rigid caste line between the upper, or white, and the lower, or Indian, classes prevents the former from indulgence in manual labor. The Indian, who is seldom an independent proprietor, usually turns over a third of what he raises to the landlord, though the proportion varies on different fincas. He has also further well-defined obligations to the landlord, such as caring for the latter's garden patch or working at the town house whenever his services are needed there.

There is little ill treatment of tenants, whose wants are few and easily satisfied. The Indian's lot is, in fact, far better than that of the ill-clad and half-starved Aymará of the "altiplano." He has plenty to eat, though there is little variety in his diet. The mild climate makes his clothing a simple matter and simplifies his housing problem. He generally lives in a hut made of adobe bricks, which form the chief building material throughout the Cochabamba valleys. Whatever troubles he may have he is prone to drown in ample potations of "chicha." However, his fellows a few hours above in the mountains lead the same wretched and narrow existence as do the Indians of the Oruro and La Paz highlands, where life is a constant struggle with a most unfavorable environment.

MARKETING OF FARM PRODUCTS.

Though most of the agricultural products raised are consumed locally, considerable quantities are sent out to the Oruro and Uyuni districts and to other parts of the altiplano unsuited to farming. Recently the Department has begun to export foodstuffs to the mining camp of Chuquicamata, in Chile. The local trade is conducted by means of public markets, which are found in all the towns of the district, as well as at the weekly fairs to which the country people bring their farm produce and cattle.

REGION OF SUCRE.

Although there are no large expanses of agricultural lands in the region of Sucre, as there are in Cochabamba, all the available lands in the numerous valleys of the district are utilized for farming. The soil of these valleys is generally fertile and the climate highly favorable to the growth of crops. Methods are very antiquated, and the most advanced implement used anywhere is a light steel plow, usually of American make. Corn is raised on a considerable scale, but most of the production is utilized in the making of "chicha," the native drink. Barley, wheat, and oats are also grown—much land that is unsuitable for any other purpose being sowed to barley. The wheat produced is ground into flour in Sucre. The best tobacco in Bolivia is grown in the Province of Azero, whence it is carried to Sucre to be made into cigarettes in the factory of the "estanco." All the tobacco is grown from old native seed. Although sugar cane is produced in the low valleys a few miles east of Sucre, it is nearly all utilized in the making of alcohol, while the sugar used in Sucre

is largely imported from Peru. The region, moreover, is well suited to the growing of fruit; oranges, grapes, and peaches are grown in relatively large quantities. Because of the deterioration of the stock of trees and because of the lack of care of them, the quality of the fruit is rather poor.

AGRICULTURE IN THE YUNGAS.

Agriculture is the most important industry of the Yungas, but it is still on a relatively small scale, owing to the lack of large areas of level ground. Practically all the farming is done on the mountain sides, although some narrow strips of land bordering on the streams and subject to inundation are cultivated. In many places the sides of the mountains present a checkerboard appearance, where they are covered with patches of coca and other crops. About Chulumani and in a few other parts of the neighboring country there are large basins among the mountains, practically all of which are under cultivation, even to the very tops of the mountains.

The greater part of the land in the Yungas is held by a comparatively small number of owners, most of whom reside in La Paz and intrust the management of their estate to a major-domo. Though there are a few independent proprietors among the Indians, some of whom have accumulated fortunes of 25,000 to 50,000 bolivianos in the coca business, the majority of the natives are tenants without any independent resources. Some of the Yungas estates have an Indian population of 150 to 250 workers.

ESTATE OF SINDICATO DE BOLIVIA.

The largest single property in the Yungas is the Cañamina estate of the Sindicato de Bolivia, a company with offices in La Paz. This huge hacienda, which has an area of about 300,000 hectares, or nearly 750,000 acres, lies on a branch of the Río de La Paz and in the Province of Inquisivi. Via Irupana and Chulumani it is about 200 kilometers (125 miles) distant from La Paz, but by a road which follows the Río de La Paz and which is open during the dry season the distance to La Paz is about 150 kilometers (95 miles). It also has connections with the main line of the Bolivia Railway over the new automobile road which the Guggenheim Mining Co. has constructed from its Caracoles mines to the Eucalyptus Station of the railway.

The altitude of the property varies from 850 to 4,000 meters above sea level. It has not only an unusually large extent of level ground, but a large area of timber suitable for lumber. The principal industry of the property at present is the growing of sugar cane for the manufacture of alcohol, of which about 120,000 liters are made annually. There are also plantations of coca, and 12,000 cacao plants were recently set out. A beginning has been made in the breeding of cattle, and it is also proposed to stock the property with 6,000 goats. This property is now being offered for sale in the United States at a price of 2,000,000 bolivianos, as its present owners do not command the capital necessary for the proper development of the land.

CULTIVATION OF COCA PLANT.

The cultivation of coca is the principal basis of the agricultural industry of the Yungas, and is also the most lucrative business of that region. There are no large plantations of coca, but it is grown on terraces, an acre or two in size, built up on the hillsides. These terraces are about 10 inches wide and are protected by a rampart of earth of about the same width and about 6 inches in height. The ramparts are generally faced on the outside with stones or with a rough cement. The use of terraces not only prevents the heavy rains from washing the whole plantation down the mountain side but it tends to hold the moisture about the roots of the plants. The plants are usually set at intervals of from 6 to 10 inches. The unit of measurement for lands devoted to the cultivation of coca is the *cato*, which is equivalent to about one-fourth of a hectare or 0.62 acre. Coca lands bring from 300 to 500 bolivianos per *cato*.

The coca plant is a shrub usually 2 or 3 feet in height, though, when allowed to mature, it reaches 4 or 5 feet. However, it is cut down to the ground before attaining that height, as the quality of the leaves deteriorates with the height of the plant. The young shoots are grown under a cover of dried banana leaves and are transplanted to the terraces. The plant begins bearing at 2 years and continues for about 20 years. The leaf, in which lies the commercial value of the plant, is oval in shape and light green in color; it is about $1\frac{1}{2}$ inches long and about $\frac{3}{4}$ inch wide.

Three or four crops of leaves are picked from the same plants during the year. Each *cato* planted to coca will produce from 7 to 14 "cestos" of leaves annually. The "cesto" is equivalent to about 25 pounds. Two "cestos" make a "tambor," which thus contains about 50 pounds of leaves. All the coca is packed for shipment in units of 1 "tambor." Of the coca production of the Department of La Paz, the Province of Nor Yungas produces about 37 per cent, Sur Yungas about 58 per cent, and Inquisivi the rest.

After the leaves are picked, they are dried in the sun on a floor made of slabs of slate. They are then pressed into bales of uniform size and weight (1 "tambor," or 50 pounds). The dimensions of these bales are about 20 by 14 by 12 inches. They are wrapped with dried banana leaves and burlap to protect them against the weather and rough handling. The coca is carried to La Paz by mules, each mule carrying a load of 4 "tambores," or about 200 pounds. The price in La Paz at the time the present report was written was about 60 bolivianos per "tambor," or about 47 cents gold per pound.

The total production of coca in the Department of La Paz is about 3,700 tons annually. The production of the Department of Cochabamba is much smaller, the 10 tons of coca leaves carried by the Oruro-Cochabamba line during 1919 being a fair index of the yield of the Yungas of Cochabamba. All coca taken into La Paz pays a duty to the Government of 1.60 bolivianos per "tambor," and the same rate is paid on all coca shipped out of the Department, whether sent to other parts of the Republic or exported to foreign countries.

The greater part of the coca exported from Bolivia goes to Argentina or Chile. Most of the competition in the international coca market comes from Peru, where it is also produced on a considerable scale, though the Peruvian leaf is said to be inferior in quality to that

produced in Bolivia. The figures for total exports during the period 1914-1919 are as follows:

Years.	Kilos.	Bolivianos.	Years.	Kilos.	Bolivianos.
1914.....	347,679	651,423	1917.....	362,548	688,841
1915.....	389,310	732,903	1918.....	355,151	771,564
1916.....	331,851	623,880	1919.....	413,050	984,479

Argentina purchased 257,515 kilos, or 73.87 per cent, of the 1918 exports of coca from Bolivia; Chile, 97,084 kilos, or 26.01 per cent; and Great Britain, 552 kilos, or 0.12 per cent.

Coca is known abroad only as the basis of the anesthetic cocaine, none of which is manufactured in Bolivia, though some is made in Peru. Most of the Bolivian production is consumed within the country, where it is widely chewed by the natives of the plateau for its narcotic effects. The natives mix it with the ashes of the quinoa plant, which serves as a condiment. Its use enables the Indian to go without food for a considerable time and to work for long stretches without rest. However, its prolonged use deadens the nerves and other sensibilities of the organism, and is thus a potent factor in the degeneration of the Indian race of the plateau. The coca habit is also widespread among the inhabitants of some parts of northern Argentina and in certain districts of northern Chile.

COFFEE PRODUCTION AND TRADE.

There are no large plantations of coffee in the Yungas, but it is cultivated in small patches throughout the entire region, or the trees are planted as hedges along the roads or around fields of other crops. Little care is given to the cultivation of coffee, and the trees are not properly trimmed or shaded. The first crop is generally picked at the end of one and one-half or two years, and the trees continue bearing fruit from 15 to 20 years. The usual yield is between 3 and 8 pounds per tree. The natives pick ripe and green berries indiscriminately, so that careful grading is difficult. However, the berries are of good size and the coffee is of excellent quality, its aroma being equal to that of any South American coffee.

As the production is limited, there has been little effort to develop a foreign market, though a consignment was recently shipped to San Francisco. Landowners in the Yungas declare their willingness to plant more coffee as soon as they are assured of a market for the production. The price in La Paz on June 9, 1920, was 50 bolivianos per Spanish quintal, of about 101 pounds (about 19 cents per pound).

In 1918 the total exports of coffee from Bolivia amounted to 13,050 kilos, valued at 11,547 bolivianos. Of this total, Chile took 12,307 kilos, valued at 10,815 bolivianos, and small quantities were taken by Argentina, Spain, and Peru. Of these exports, 7,699 kilos were produced in Nor Yungas and 5,351 kilos in Sur Yungas, the Coroico district being the largest producer. In addition, 125 kilos of ground coffee were shipped to Chile. In 1919 exports amounted to 205,427 kilos, valued at 232,868 bolivianos.

The imports of coffee into Bolivia for the period 1914–1918 were as follows:

Years.	Kilos.	Bolivianos.	Years.	Kilos.	Bolivianos.
1914.....	19,223	19,331	1917.....	21,257	21,257
1915.....	17,558	17,558	1918.....	67,344	67,344
1916.....	27,782	27,782			

Of the 1918 imports, 38,926 kilos came from Brazil, 21,962 kilos from Peru, 6,336 kilos from Argentina, and 120 kilos from Uruguay. About one-third of this coffee entered Bolivian territory through the customhouse of Cobija and another third from the customhouses of Abuna, Yacuiba, Villa Bella, and Puerto Suarez, all of which are located in either the Amazon or the Paraguay zones of the Republic. The remaining third was entered through the customhouses of La Paz and Oruro, where it was within the zone of competition of the Yungas coffee. Imports of ground coffee during 1918 amounted to 4,368 kilos, as against 1,554 kilos for 1917. Of this, only 53 kilos entered through the customhouses of the plateau, the remainder being destined for eastern Bolivia and the Amazon region.

CACAO CULTIVATION—OTHER PRODUCTS.

The cultivation of cacao has been little developed as yet, though parts of the Yungas are very well suited to its growth. In 1918, 1,889 kilos, to the value of 3,683 bolivianos, were exported from the Coroico district to Chile. Imports of cacao into Bolivia during the same year, largely from Peru, amounted to 59,209 kilos, with a total customs value of 41,446 bolivianos. Imports of prepared cacao, all from the United States, amounted to 170 kilos in 1918.

In spite of the lack of attention given to the trees, the quality of the Yungas oranges is probably unsurpassed in South America. They are of good size (though not so large as those of Bahia), extremely juicy, and of excellent flavor. Most of the production is consumed in La Paz, to which market they are carried on burros. The production of tangerines is also considerable.

Bananas are grown in large quantities throughout the Yungas and are carried thence to La Paz, but their quality is generally inferior. Lemons and limes of very good quality are also grown.

Though the climate is suited to the raising of sugar cane, comparatively little is grown, and the small production is utilized in the manufacture of alcohol. Tobacco is also grown on a small scale. Corn is grown to supply the needs of the local population, as is also yucca, or "mandioca," which is one of the staple articles of food of the natives of the region.

AGRICULTURAL POSSIBILITIES IN EASTERN BOLIVIA.

The region of greatest agricultural possibilities in Bolivia lies in the eastern part of the country and extends from the plains of the Beni around across the Department of Santa Cruz and south into that of Tarija. However, in the country which borders the true Chaco to the west and extends from the Rio Grande to the Pilcomayo, natural conditions are not so favorable to agriculture as they are

either to the south in Tarija or to the north in the plains of Mojos and Santa Cruz in the valleys of Chiquitos. Their soil and climate favor a high agricultural development, but much of the country from Vallegrande south to Villa Montes shares in the liability to drought that is a characteristic of the Chaco.

CROPS GROWN—PRINCIPAL DISTRICTS DEVELOPED.

In spite of its natural advantages, agricultural development in the Amazonian region is still very backward, so that a large part of the foodstuffs consumed is brought in from Brazil or from the Santa Cruz country. In some parts agriculture has even retrograded from its former condition. The crops most commonly grown are rice, sugar cane, corn, yucca, and sweet potatoes. Cacao, coffee, and tobacco are also grown. There is little cultivation of cotton, though formerly considerable quantities were produced, which supplied the raw material for a local industry in the manufacture of excellent hammocks, ponchos, etc. Bananas and oranges are grown in many places, but everywhere on a small scale. The most advanced regions agriculturally are the Mojos plains in the vicinity of Trinidad and the upper Itenez country. In the latter district there are several large properties where cacao, coffee, and sugar cane are raised. In the lands about the lower courses of the rivers, patches of corn, yucca, sweet potatoes, and rice are grown for the use of the population of rubber gatherers about the "barracas." Agriculture in the lower Beni country has been given a considerable impulse by the immigration of Japanese from Peru by way of the Madre de Dios and along the Beni above and below Riberalta. The missions are also encouraging the development of farming among the population under their control. The greatest possibilities in agriculture are in the cultivation of cotton, sugar cane, cacao, and tobacco, while vanilla should also do well.

REGION OF SANTA CRUZ.

In spite of the great natural advantages of the Santa Cruz region—the vast extent of level and fertile land and a highly favorable climate—agricultural operations have probably fallen off 25 per cent during the past two decades. This decline is largely due to the fact that new lines of transportation have been pushed in from the outside toward the Santa Cruz country, tapping fields that were formerly markets for the consumption of the products of that region. The most important of these lines were (1) the railway from Oruro to Cochabamba, which enables the Peruvian sugar to enter the Cochabamba market at a lower price than the sugar of Santa Cruz; (2) the Madeira-Mamore Railway, which has taken from Santa Cruz much of the market of the Beni; and (3) the Embarcacion branch of the Argentine Central Northern, which has enabled Argentine products to compete successfully in southern Bolivia with the products of Santa Cruz. The development of better agricultural methods is also needed in the Santa Cruz region, as everywhere in Bolivia—a need that could be partly met by the establishment of agricultural schools. The predominant soil is alluvium of comparatively recent formation, and in the plains country is rich in humus. Most of the land is held in large estates, the "haciendas" ranging in size from 10 to 100 square leagues of 5,760 acres each. Some of the owners of these properties have held their lands for a long time.

The most highly developed agricultural districts are located in the Provinces of Sara and Cercado, particularly to the northwest of Santa Cruz. There are also huge extensions of virgin lands suitable for farming in the more remote regions of Nuflo de Chavez, Velasco, and Chiquitos. Irrigation is practiced in Vallegrande and to a lesser extent in Cordillera, and in the latter region dry farming should be highly practicable.

The Santa Cruz plains are excellently adapted to the raising of sugar cane. The cane is generally planted in November and cut in May, the same plants being worked for three or four years. The sugar produced is of fairly good quality in spite of the antiquated methods used in refining it. Most of the industry is carried on by small "trapiches," or crushing mills, and the sugar is whitened by means of mud. The largest establishment is that of Zeller, Villinger & Co., near Santa Cruz, the equipment of which cost about \$150,000 and required a year for its transportation from Puerto Suarez by means of ox-carts. A company has also been organized recently by local capital for the purpose of putting up a large refinery, and representatives of these interests are now on their way to Buenos Aires to acquire the necessary machinery for the installation of the plant.

Most of the sugar produced is consumed locally, though some is sent to the Beni and small quantities to Cochabamba. Three hundred thousand arrobas (arroba equals about 25 pounds) were formerly sent to Cochabamba each year.

The actual production of cotton represents only a very small proportion of the possibilities of the region in this line. Two varieties of plant are commonly grown. One of these is ready for picking in five or six months, with a fiber from 4 to 5 centimeters long. The other is a native cotton bush or tree, which grows to a height of 6 feet or more and bears for about 20 years. This plant produces 6 to 8 pounds of cotton twice a year, and an acre will produce about three 500-pound bales of seeded cotton.

Rice is an important article of local diet and is widely grown in the more low-lying districts of the Department.

Though formerly important in some districts, as in Vallegrande, the cultivation of tobacco has declined. Growers claim that the Government "estanco" or monopoly has discouraged the industry, though some tobacco is made up into cigarettes at Vallegrande in defiance of the privileges of the "estanco." In Chiquitos three crops of tobacco are produced from the same root.

Coffee of prime quality is grown about San Jose and Santiago in Chiquitos, though in limited quantities. Coffee is also produced in other parts of the Department.

Wheat, barley, and potatoes are grown in Vallegrande. Maize does well and is widely grown throughout the Department. A good grade of cacao is produced in the northeastern section of the Department, and yerba mate has been successfully produced in Chiquitos and Velasco. A large variety of fruits flourish in this part of Bolivia. These include bananas, oranges, pineapples, melons, lemons, alligator pears, grapes, figs, and pomegranates. Oranges and lemons grow wild and melons yield almost the entire year in Chiquitos. Excellent vegetables can be raised almost everywhere, and yucca or "mandioca" constitutes a very important item of diet among the common people of the region.

FOREST INDUSTRIES.

WOODS.

Though Bolivia possesses immense timber resources in the vast eastern lowlands and in the montaña region on the eastern side of the Andes, almost nothing has been done to exploit them. The forested area includes most of the Territory of Colonias and the Department of El Beni, and comprises large districts of the Department of Santa Cruz and of the Chaco country to the south. There are probably more than 60,000 square miles of forest in the Department of Santa Cruz. Scattered over the great plain about Santa Cruz are isolated patches of woodland, and in parts of Chiquitos and Cordillera there are wide expanses of dry, scrub forest. The Monte Grande east of Santa Cruz is a vast forest wilderness, and across the northern part of the Department, from Sara east across Nufflo de Chavez and Velasco to the Brazilian border, there stretches an immense area of real tropical forest. Large sections of the montaña region in the Departments of La Paz, Cochabamba, and Chuquisaca are also forested. However, the table-land is almost treeless, save where such trees as eucalyptus have been planted in protected localities. Apple trees are grown in the bleak climate of Oruro, and some of the trees produce a good variety of fruit.

The chief obstacles to the working of timber in the forested regions of Bolivia are the lack of transportation facilities and the peculiar character of the tropical forest. No railways tap the timber country, and, though there is a fine system of natural waterways, the rivers flow away from the lumber market of the country instead of toward it. Moreover, many of the native hardwoods are too heavy to be carried in rafts. The forests of the Amazonian region are also so dense and so tangled with a luxuriant undergrowth that it is difficult to penetrate them, and lumbering operations are consequently attended with great difficulties. Nowhere are solid stands of a single species of tree found in these forests, but a given area may contain a large variety of trees. A Franciscan mission in the Province of Velasco sent 125 specimens of woods to the Panama-Pacific Exposition at San Francisco in 1915, and 82 specimens were sent from one estate in the Chapare region of the Department of Cochabamba.

Among the most common woods of eastern Bolivia are the useful cedro (or Spanish cedar), jacaranda, lapacho, laurel, quebracho blanco, urunday, palo santo, palo blanco, mahogany, walnut, ebony, incenso, and the giant carob. Some of these are valuable cabinet and construction woods. Among trees with a high tannin content is the curupay. Most of these woods are described in the writer's commercial handbook of Paraguay, Special Agents Series No. 199. These woods are generally known by Indian names, and the same tree may have several different names in as many parts of the country. Some of the native woods, such as the tajibo negro, or

"iron tree," are of extraordinary hardness, and others are extremely light, as in the case of the palo de balsa, which is used in the Colonias and lower Beni regions for making canoes.

In spite of the timber wealth of the country, lumbering operations are very limited and are carried on in an unprogressive manner. Sawmills are small and few in number, and axes, adzes, and cross-cut saws are the principal tools used in lumbering.

RUBBER.

The rubber industry, one of the most important in Bolivia, is centered in the Amazonian region of the Republic. Though the first rubber was taken out along the Mamore in 1864 and production amounted to 2,000 arrobas (25.36 pounds each) by 1878, the development of the industry on a large scale dates from the eighties. Much of the rubber country was explored about that time by an American, Edwin Heath. The year 1882 was a great one in the history of the industry, but the depression caused by the outbreak of swamp fever, which followed the floods of 1886, caused a temporary setback. With the rapidly increasing demand for the product, rubber hunters poured into the Beni and Mamore districts, and numerous companies were organized to exploit the resources of those regions. Production in 1898 was double that of the previous year, and in 1900 it reached the highest figure attained until 1911. However, the best returns from the business were during the boom years from 1909 to 1911, during which period rubber reached the maximum price of 12 shillings (\$2.92) per pound. From that time the decline in the returns was constant until 1915, but the yield of 1917 brought only about two-thirds as much as did that of 1910. By 1917 the East Indian plantations were producing and Amazonian rubber had taken the second place in the world market, at least so far as quantity was concerned.

PRODUCING DISTRICTS.

Rubber is found in the Territory of Colonias and in the four northernmost Departments of the Republic—El Beni, La Paz, Cochabamba, and Santa Cruz. The Beni district has steadily declined in relative importance as its stock of trees has been worked out, and the Territory of Colonias has become the most productive rubber region in Bolivia. Rubber trees are found in large quantities along all the rivers of Colonias, including the Acre, Abuna, Orton, Madre de Dios, and their tributaries. Development in all these districts is comparatively recent, the rubber resources of the Abuna not having been worked until 1904. Most of the "gomales," or rubber plantations, of El Beni are along the lower reaches of the Beni and the Mamore, in the Province of Vaca Diez, and to a lesser extent in that of Yacuma; there are also important fields in the Itenez Basin. The rubber districts of Santa Cruz are located in the Provinces of Nuflo de Chavez and Velasco, and lie mostly between the San Miguel and the Paragua. San Ignacio and Concepcion are the chief centers of the rubber business of this part of Bolivia. The rubber industry of the Department of La Paz is restricted to the Province of Caupolicán and, to a much smaller degree, those of Larecaja, Munecas, and Nor Yungas. The comparatively unimportant "gomales" of the Depart-

ment of Cochabamba are situated in the Province of the Chapare in the basin of the river of that name and in the basin of the D'Orbigny.

KINDS OBTAINED—LOCATION OF TREES.

The highest grade of Amazonian rubber, known as Para fine, is derived from the hevea tree, which stands from 30 to 40 meters (meter=3.28 feet) high and may attain a diameter of a meter or even more. An inferior grade of rubber is extracted from the caucho tree (*Castilloa elastica*). The product is sold on the market as caucho. The caucho trees that are worked are generally from 30 to 50 meters high. Contrary to the procedure used with the hevea, the caucho must be cut down in order to obtain the sap. The rubber known as ceara is extracted from the manicoba tree (*Manihot glaziovii*), which is also found, though not in great numbers, in the Bolivian forests.

The rubber trees do not exist in solid stands, but are found scattered throughout the general forest. The belts along the rivers where they occur seldom extend inland more than 10 or 12 miles. The tree prefers low ground in the neighborhood of swamps and watercourses, where the moisture is retained in the ground throughout the year, and it appears to thrive best on land that is inundated about once every three years.

LAWS REGARDING RUBBER LANDS.

Bolivian legislation in regard to rubber lands is based on the Ley de Gomas of December 12, 1895, put into effect by decree of June 30, 1896, and modified in important respects by a series of subsequent laws. The law of 1895 fixed the "estrada" of 150 rubber trees as the unit of concessions of land, and authorized the delegate of the Territory of Colonias and the prefects of Departments in which rubber trees existed to grant up to a maximum of 500 "estradas" to individuals and 1,000 estradas to legally constituted companies. The privilege of making larger grants was reserved to the National Congress. These provisions were not to affect the titles to properties already constituted which contained more than the maximum number of estradas permitted by the law. The concessionaires were to pay for each "estrada" 15 bolivianos in 15 yearly installments, though they might consolidate their title by paying the entire sum at once. All properties granted were to be surveyed and their limits clearly marked off.

The custom of measuring grants by "estradas" gave rise to such great abuses that a law of October 26, 1905, was issued declaring that "the unit of measurement for all acquisitions is the hectare, the granting of lands by 'estradas' being prohibited henceforth." According to this law, any native of the Republic or foreigner capable of assuming the obligations of the civil law might acquire by purchase from the Government a maximum of 20,000 hectares at the price of 1 boliviano per hectare. Purchasers of such lands were obligated to colonize the land at the rate of one family for each 1,000 hectares. A special act of Congress was required for grants of land exceeding 20,000 hectares. Those who were in possession of State lands to which they had not confirmed their titles were given a period of two years in which they might consolidate their rights to these properties in conformance with the requirements of this law. In the event of

failure to satisfy the provisions of the law the lands in question were to revert to the State. This law was put into execution by a decree dated June 20, 1907.

The further sale of public lands was suspended by a law of September 11, 1915, and those who had occupied public lands in accordance with the law of 1905 were allowed until the end of 1920 in which to perfect their titles. Further petitions for lands were to be reserved for the exclusive consideration of the National Congress. A law of September 26, 1917, provided for a tax of one-half centavo (1 centavo = 0.3 cent) per hectare on all lands secured under the provisions of these laws, the proceeds to go toward a fund for the construction of a railway from Cochabamba to Santa Cruz.

The relation between the "estrada" and hectare, which had been left undetermined by the law of 1905, was fixed at 75 hectares for each estrada by a law of October 31, 1917. All grantees of lands under the previous law who had not perfected their titles at this time were required to accept this proportion in determining the extent of their properties. In case the land actually occupied exceeded the maximum provided for in accordance with this ratio, the holder of the land might either renounce the excess or retain it by the payment of 20 centavos for each hectare of excess.

Practically all the rubber-bearing lands in Bolivia are now included in grants to which the titles have either been perfected or which are the subject of negotiations with the Government. However, many holders of rubber lands have not complied with the requirements of the laws under which they have received their grants, and the Government anticipates that on the expiration of the term allowed by the law of September 11, 1915 (Dec. 31, 1920), this failure to comply with the terms of their concessions will require it to reassume large tracts of land now occupied by the rubber companies. The requirement in regard to the settlement of one family for each thousand hectares of land has not been complied with in many cases.

PRINCIPAL COMPANIES.

The most important of the rubber interests operating in Bolivia include the following:

Suarez Hermanos, the most powerful of all the Bolivian rubber companies, has its home offices in London and also has a receiving and forwarding station at Para. The Bolivian headquarters of the Suarez interests are located at Cachuela Esperanza, a short distance above Villa Bella, on the Beni, at which point are large stores and warehouses. The rubber fields extend along the Beni to Riberalta and up the Madre de Dios to the Peruvian frontier. In addition the company has nearly 2,000,000 hectares on the Orton and its tributaries, besides large properties on the Acre and the Abuna. Altogether it possesses nearly 10,000,000 hectares. About 60 per cent of the rubber sent through Villa Bella is consigned by it. The total resources of this firm are said to aggregate about 50,000,000 bolivianos.

The German firm of Alfredo W. Barber & Co. has its central office in Cochabamba, with branches in Trinidad, Guayaramerin, and at several points in the Itenez country, where it possesses large "gomales." It also has properties in the Abuna and Mamore districts.

A long-established German company, Zeller, Villinger & Co., has rubber properties scattered from the Beni country to the upper Itenez region. It has houses at Riberalta, Guayaramerin, Baures, and Magdalena (Itenez), Santa Cruz, Trinidad, and Puerto Suarez (Rio Paraguay).

Brailard & Co., a French company, with headquarters at Riberalta, owns gomales in the Beni and along some of the rivers of the Territory of Colonias.

Another French company, known as Société Picolet, was founded in 1910 with a capital of 2,500,000 francs (1 franc=19.3 cents), which has been increased to about 3,500,000 francs. The center of operations of this firm is in the Abuna district, with a trading house at Manoa, at the mouth of the Abuna.

The trading house of Guillermo Demmer is located at Riberalta and owns gomales in northern Colonias.

The Sociedad Comercial Matto Grosso y Bolivia, which is the German firm of Stoffen, Schuack, Müller & Co., has trading stations at Guayaramerin, Santa Cruz, Puerto Suarez, Corumba (Brazil), and at certain points in the Itenez region. Most of its rubber properties are situated in the Itenez.

Still another German firm, Komarek & Bruckner, owns gomales in the Itenez and trading houses at Magdalena and Baures.

The rubber lands of the English Anglo-Bolivian Rubber Estates (Ltd.) are situated in the basin of the Rio Blanco, in the northern part of the Department of Santa Cruz. Its chief center of operations is Concepcion, in the Province of Velasco. It formerly took out most of its rubber through Puerto Suarez and the Rio Paraguay, but recently closed the former post.

The Bolivian, Nicanor G. Salvatierra, has large gomales in the Madre de Dios, Abuna, and Beni.

Besides these interests, there are scores of others with rubber estates, some of them aggregating over 200,000 hectares of land.

METHODS OF EXPLOITATION—"HERRINGBONE SYSTEM."

The methods of gathering the rubber used by the Bolivian "seringueiro," or extractor and coagulator, are much the same throughout the rubber districts of the Republic, though some improvements have been made in the procedure of extraction during the last few years. Each "seringueiro" or "picador" is assigned an estrada of 150 trees, which he is to work. Every day during the season he goes the rounds of his estrada, beginning his labors about daybreak. With a long-handled hatchet he makes from 6 to 12 incisions in the bark of the tree as high as he can reach on the trunk, and under each incision he places a tin cup into which the latex or sap flows. It requires about three hours to make this first round of the estrada, and after a short rest the "seringueiro" makes a second round of the trees to collect the latex from the cups. He empties the latex into a bucket and carries the proceeds of his morning's work to his encampment for coagulation, which is accomplished by a smoking process.

The contents of the bucket are poured into a basin and the latex poured over a stick which is revolved in the dense smoke produced from hard palm wood or palm nuts burned in a small oven. The latex coagulates rapidly in this smoke and gradually forms a ball, which is taken off when at a convenient size, about 40 or 50 pounds, and placed to dry under a roof of palm leaves. In this way the characteristic Para rubber balls are produced, and an incision will show the layers made by the turning of the rubber during the process of coagulation.

Each day the workman makes the incision on the tree an inch or two lower down on the trunk until the roots are reached, when the tree is left to rest until the next year. Trees are worked continuously during the rainy season of each year for two or three years, and then are not worked for an equal period. The life of a tree which is under exploitation is from 15 to 30 years, largely depending on the care which is used in making the incisions. Those made by a careless "picador" will reach below the bark of the tree and injure its vital parts, thus causing it to die before its natural term of life.

Of late years experiments have been made with the so-called herring-bone system, which is used on the plantations. By this method a knife with a short convex blade just wide enough to enter the bark is used to make a long, vertical incision about 4 feet in length. A number of parallel lateral incisions are then made on each side of and terminating in the central incision. The latter serves as a kind of trough through which the latex from the lateral incisions flows down the side of the tree and out through a small spout into a bucket. This method preserves the tree from the dangers which result from the deep incisions made by the old system in which the hatchet is used.

SCARCITY OF LABOR SUPPLY.

The labor question in the rubber country has always presented serious difficulties because of the scarcity of the labor supply within reach of the "gomales." During the nineties and the height of the rubber boom, many abuses were undoubtedly committed in the effort to secure laborers, especially by the "enganchadores" or contractors who supplied the rubber companies with their labor force. The system used in most cases was to advance the Indian who was hired as "seringueiro" a certain amount of money, usually equivalent to the value of about 200 pounds of rubber. The Indian agreed to work on the estate for a year or more, or else to deliver a certain quantity of rubber. He was paid for the rubber delivered and charged with the value of the food and other articles which he bought in the stores operated by the company. Besides the acquisition of his necessary working equipment, which included a hatchet and other articles used in gathering the rubber, and generally a rifle for hunting, the "seringueiro" was prone to waste his pay on drink, articles of display, and other unnecessary purchases. As a result he often found himself so deeply in debt to the owner of the estate that he was not able to pay off his account at the end of his contract. In this case it was common for him to be retained at work on the estate until he had paid off his debt, which might be an affair of years.

IMPROVEMENT IN CONDITION OF RUBBER GATHERERS.

A national law of November 14, 1896, aimed to correct the worst abuses of the labor system as it existed then, and to protect the rights of the peons. This law required that the contractor or employer should pay the transportation of the laborer from his home to his destination in the "gomales," and thence to his home at the expiration of his contract. The patron was also obliged to supply the laborer with food and, in case of sickness, with medicines. The amount of money that might be advanced to a peon was also limited to 400 bolivianos, and employers were forced to supply their workmen with a book in which the latter's accounts could be kept and in accordance with which their accounts could be periodically liquidated. Each contractor of peons was furthermore required to deposit 200 bolivianos in some depository designated by the Government for each peon contracted, as a guaranty of his compliance with the conditions in regard to returning the peons to their homes at the expiration of

their contracts or paying them the 100 bolivianos prescribed in case they desired to remain in the rubber country.

There has been a manifest improvement in the condition of the rubber gatherers during the past few years, though on the other hand they have suffered severely from the rise in prices of necessities. Some rubber companies still adhere to the old system of contract and advances; however, many estates are now running their labor as far as possible on a strictly pay-on-delivery basis. Employers complain that their workmen are given to decamping on the slightest provocation or for no other reason than their momentary whims, despite the terms of their contracts; therefore "seringueiros" are being encouraged to bring in their families and establish homes on the rubber estates, where they can cultivate a piece of land and live more or less permanently.

Sometimes a section of rubber forest is rented to a contractor, who occupies a certain area which he works with peons hired by himself. He sells the rubber produced to the owner of the "gomal" at a pre-arranged price. However, those who rent lands in this fashion work them with a view to gaining the largest possible return for themselves within the shortest possible time, to the ruin of the property rented, so that this arrangement serves only as a last resort.

COMPETITION OF PLANTATION RUBBER.

The Amazonian rubber industry, including, of course, that of Bolivia, has been seriously threatened by the rapid development of the East Indian plantations. Though realizing the menace, the South American rubber interests have done little to meet it. A few Bolivian companies have considered the establishment of plantations, and at least one prominent rubber grower has actually planted some trees, but the movement has progressed no further. Meanwhile, owing to their more economical methods, the plantations have rapidly gained control of the world rubber market. The following chart will illustrate the rise of the plantation industry and its relative position in the rubber industry of the world (1 long ton = 2,240 pounds):

Years.	World production.	Production of plantations.			Years.	World production.	Production of plantations.		
		Quantity.	Acreage.	Percentage of total.			Quantity.	Acreage.	Percentage of total.
	<i>Long tons.</i>	<i>Long tons.</i>				<i>Long tons.</i>	<i>Long tons.</i>		
1906.....	66,210	510	237,240	0.7	1911.....	120,380	71,380	1,727,820	59.2
1907.....	69,000	1,000	402,912	1.4	1915.....	158,702	107,867	1,792,795	67.9
1908.....	65,400	1,800	515,385	2.8	1916.....	201,598	152,650	1,915,553	75.7
1909.....	69,600	3,100	981,355	5.2	1917.....	255,879	201,251	1,995,553	79.5
1910.....	79,500	8,200	885,079	11.6	1918.....	211,579	200,970	.....	83.1
1911.....	75,149	11,419	1,200,407	19.2	1919.....	381,860	340,225	.....	89.0
1912.....	98,928	28,218	1,418,033	28.5	1920.....	403,600	360,000	.....	89.3
1913.....	108,110	17,618	1,611,121	13.9					

† Estimated.

The position of Amazonian and other rubber, chiefly African, during the same period is represented by the following table:

Years.	Amazonian.		African, etc.		Years.	Amazonian.		African, etc.	
	Long tons.	Percentage of total.	Long tons.	Percentage of total.		Long tons.	Percentage of total.	Long tons.	Percentage of total.
1906.....	36,000	54.4	29,700	44.9	1914.....	37,000	30.7	12,000	10.0
1907.....	38,000	55.1	30,000	43.5	1915.....	37,220	23.5	13,615	8.6
1908.....	39,000	59.6	24,000	37.6	1916.....	36,500	18.1	12,448	6.2
1909.....	42,000	60.3	24,000	34.5	1917.....	39,370	15.3	13,258	5.2
1910.....	40,800	57.9	21,500	30.5	1918.....	30,700	12.5	9,929	4.1
1911.....	37,730	50.2	23,000	30.6	1919.....	31,285	8.9	7,350	1.92
1912.....	40,410	42.9	28,000	28.3	1920.....	135,000	8.6	18,000	1.98
1913.....	39,370	36.3	21,452	19.8					

¹ Estimated.

COMPARATIVE PRICES.

The comparative average prices of plantation and fine grade Amazonian rubber for the same period were as follows, in shillings and pence per pound:

Years.	Plantation.	Fine hard Para.	Years.	Plantation.	Fine hard Para.
	s. d.	s. d.		s. d.	s. d.
1906.....	5 10½	5 2½	1913.....	3 0½	3 8
1907.....	4 11½	4 6	1914.....	3 0½	2 10½
1908.....	4 2½	4 0½	1915.....	2 6	2 7
1909.....	7 1	6 11	1916.....	2 10½	3 1½
1910.....	8 9	8 10	1917.....	2 9½	3 1½
1911.....	5 5½	5 0	1918.....	2 3½	2 11½
1912.....	4 9	4 10	1919.....	2 0½	2 5½

[According to the Daily Commercial Report, published in London on Sept. 15, 1920, quotations on plantation rubber were 1s. 7½d.; on fine hard Para, 1s. 8d.]

EXPORT DUTIES DEPENDENT ON RUBBER QUOTATIONS.

The Bolivian export tariff provides for the following scale of duties on the exportation of rubber. The duty depends on the quotation on the pound of rubber:

Quotation, pence per pound.	Value of the metric ton.	Duty.	Quotation, pence per pound.	Value of the metric ton.	Duty.
Fine:	<i>Bolivianos.</i>	<i>P. ct.</i>	Ordinary:	<i>Bolivianos.</i>	<i>P. ct.</i>
10 to 24.....	798 to 1,915	Free.	10 to 24.....	558 to 1,340	Free.
25 to 36.....	1,995 to 2,872	2	25 to 36.....	1,396 to 2,010	2
37 to 48.....	2,952 to 3,830	4	37 to 48.....	2,066 to 2,681	1
49 to 100.....	3,910 to 7,980	6	49 to 100.....	2,737 to 5,586	6

For fine rubber, the official value, on the basis of which the duty is levied, is fixed at 70 per cent of the market quotation in London; while the official value for ordinary rubber is 70 per cent of that for the fine. The quotations are forwarded twice a month by the Bolivian consulate in London.

CLASSIFICATION OF RUBBER.

On the arrival of a consignment of rubber at Manaos or Para, a "bolacha" or sample ball is cut through several layers with a knife for the purpose of classifying the lot. There are eight classes, according to this preliminary inspection, though the rubber is generally shipped as of two classes. The eight classes are as follows: Fina, fina flaca, entrefina, entre-fina-flaca, sernamby en rama, sernamby virgen, sernamby de caucho, and caucho. However, these are exported to the foreign market as "fine" or "ordinary." The rubber known as fine hard Para is the prime product of the latex of the hevea. Sernamby is second-quality rubber, and, though a product of the hevea, it contains impurities which mar its value; it is sometimes made of the residue after the preparation of the fine Para. If rain has fallen in the cups while the latex is being collected, the product will be classified as sernamby. Caucho is the product of the caucho tree and is altogether a lower grade of rubber.

The fact that Bolivian rubber is classed as either Para or Mollendo on the foreign market does an injustice to Bolivia, against which Bolivians have long protested. Amazonian rubber is known to the rubber trade only by the ultimate port of shipment, which is generally either Para, Brazil, or Mollendo, Peru. The rubber from the country about the lower reaches of the rivers is exported through Para, and that from the Beni headwaters is sent out through the Pacific port of Mollendo. However, one important Liverpool house lists the rubber from the upper Beni as Mapiri, from the name of the river along which most of it is collected.

EXPORTS FROM 1890 TO 1919.

The exports of rubber from Bolivia during the period 1890 to 1919 were as follows (1 kilo = 2.2 pounds):

Years.	Kilos.	Value in bolivianos.	Years.	Kilos.	Value in bolivianos.
1890.....	294,000	1,260,000	1905.....	1,677,796	7,341,165
1891.....	345,000	1,350,000	1906.....	1,929,608	10,612,848
1892.....	363,400	1,422,000	1907.....	1,830,513	8,844,380
1893.....	391,818	1,501,910	1908.....	2,006,591	11,286,541
1894.....	632,500	2,475,000	1909.....	3,052,453	21,947,138
1895.....	820,100	3,070,300	1910.....	3,117,650	27,653,555
1896.....	1,140,712	4,838,560	1911.....	3,615,551	18,921,192
1897.....	1,671,216	6,551,280	1912.....	4,079,828	15,508,721
1898.....	3,155,955	13,556,593	1913.....	5,143,211	14,651,647
1899.....	2,110,000	8,210,000	1914.....	4,484,915	8,280,370
1900.....	3,196,240	10,103,959	1915.....	5,051,847	10,768,937
1901.....	3,165,063	9,151,823	1916.....	4,916,545	13,292,261
1902.....	1,902,993	5,910,331	1917.....	5,813,213	15,424,202
1903.....	1,321,031	2,977,819	1918.....	4,287,511	11,038,042
1904.....	1,569,628	4,175,828	1919.....	5,347,323	10,671,096

Exports of 1918 were divided into 2,860,509 kilos of "fine," valued at 8,272,579 bolivianos, and 1,427,005 kilos of "ordinary," valued at 2,765,463 bolivianos.

RELATION OF RUBBER TO OTHER EXPORTS.

The relation of exports of rubber to the total export trade of the Republic from 1911 to 1918 is shown by the following table:

	Percentage of value.		Percentage of value.
1911.....	22.89	1916.....	13.09
1912.....	17.20	1917.....	9.79
1913.....	12.58	1918.....	6.04
1915.....	11.31		

This falling percentage is largely due to the increase in the exports of tin and other minerals, and to a decrease in the price of rubber.

UNITED STATES CHIEF COUNTRY OF DESTINATION.

In 1918 exports of fine rubber to various countries were as follows:

Countries.	Kilos.	Value.		Countries.	Kilos.	Values.	
		Bolivi- anos.	Per cent.			Bolivi- anos.	Per cent.
United States....	2,404,334	6,966,424	81.22	Great Britain....	115,328	294,015	3.53
France.....	198,813	591,131	7.15	Spain.....	715	2,517	.03
Uruguay.....	141,145	418,041	5.06	Chile.....	174	443	.01

The increasing importance of the United States as a buyer of Bolivian rubber is shown by the following table, which gives the percentage taken by the chief countries of destination since 1912:

Countries.	1912	1913	1914	1915	1916	1917	1918
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
United States.....	2.30	3.7	9.4	91.7	91.45	83.98	84.22
Germany.....	30.2	17.8	10.75	.3			
Belgium.....	12.5	8.9	3.5				
France.....	9.5	18.15	12.9	1.4	2.27	6.81	7.15
Great Britain.....	45.5	50.9	63.45	6.6	1.08	6.52	3.53

PRODUCTION BY DISTRICTS.

The production of rubber by districts during the years 1911 to 1916 was as follows:

Year and district.	Quantity.		Value.	
	Kilos.	Percent- age.	Bolivianos.	Percent- age.
1911.				
Colonias.....	1,617,072	44.36	8,597,871	45.45
Beni.....	1,596,857	41.33	7,762,151	41.02
La Paz.....	315,150	8.64	1,547,386	8.18
Santa Cruz.....	206,172	5.66	1,013,770	5.35
1912.				
Colonias.....	1,895,069	46.39	7,778,758	50.16
Beni.....	1,783,563	43.66	6,393,720	41.23
La Paz.....	926,693	7.26	890,079	5.74
Santa Cruz.....	109,503	2.69	446,161	2.87
1913.				
Colonias.....	2,820,935	54.85	7,135,850	48.71
Beni.....	1,907,056	37.06	6,400,828	43.69
La Paz.....	290,061	5.65	725,152	4.94
Santa Cruz.....	125,161	2.44	389,815	2.66
1914.				
Colonias.....	3,933,288	87.73	7,259,759	87.68
Beni.....	149,281	3.32	276,279	3.34
La Paz.....	198,645	4.42	367,481	4.43
Santa Cruz.....	203,700	4.53	376,847	4.55
1915.				
Colonias.....	991,005	48.22	8,774,889	81.23
Beni.....	698,987	34.01	1,411,036	12.99
La Paz.....	185,996	9.06	167,555	1.56
Santa Cruz.....	178,957	8.71	455,445	4.22
1916.				
Colonias.....	3,894,744	79.22	10,621,165	79.91
Beni.....	608,144	12.37	1,619,228	12.18
La Paz.....	207,743	4.23	440,977	3.32
Santa Cruz.....	205,913	4.18	610,892	4.59

Exports of rubber from Bolivia by regions during 1918 were as follows:

	Bolivianos.		Bolivianos.
Colonias.....	9,831,181	Santa Cruz.....	465,018
Beni.....	602,986	Cochabamba.....	4,575
La Paz.....	134,282		

The principal customhouses through which rubber is exported are Villa Bella, Guayaramerin, Cobija, and Abuna for Colonias and the Beni; Puerto Suarez for the upper Itenez and Santa Cruz; and La Paz and Puerto Acosta for the upper Beni region.

[Loan copies of a map which shows the location and extent of all rubber properties may be obtained from the Latin American Division, Bureau of Foreign and Domestic Commerce.]

QUININE BARK.

The headwater districts of the Beni affluents are the principal source of the Bolivian supply of quinine bark. The product is placed on the market under different names, such as "cassarilla," "calisaya," "cinchona," and "quina." The bark that is stripped from the trunk of the tree is known as "quina tabla," and that which is stripped from the branches is called "quina canuto," or "quill." The bark is well dried and exported in bundles of approximately 50 pounds.

Until the beginning of the present century this industry was very prosperous, the price of the bark reaching 204 bolivianos per quintal of about 101 pounds in 1878 in the Yungas of La Paz. However, with the development of the plantation product the Bolivian bark was unable to hold its former place in the world market. During the last few years prices have again become more favorable, and the industry has taken on new life in Bolivia. The Apolo, Mapiri, Challena, and Nor Yungas districts are the principal producers, and most of the exports go through the west-coast ports of Arica and Mollendo.

Exports during the period 1913-1918 were as follows (kilo = 2,2046 pounds): 1913, 41,183 kilos; 1914, 26,538 kilos; 1915, 78,561 kilos; 1916, 158,488 kilos; 1917, 196,742 kilos; 1918, 168,919 kilos. Of the total production in 1918, 63.86 per cent went to the United States, 15.81 per cent to Great Britain, and 9.48 per cent to Spain.

MANUFACTURES.

Manufacturing industries in Bolivia are of relatively small importance, as might be expected from the present state of the country's economic development and the absorption of its attention and surplus capital in mining. In the first place, the labor supply that could be drawn upon to furnish factory workers is small. The Indian is out of the question for this class of work, and few cholos have the acquaintance with machines required to make machine operators, though they have a good natural aptitude for this class of work. The question of power is another important consideration in the manufacturing field in Bolivia. The supply of native fuel materials is very deficient, and these materials are, moreover, ill suited to this purpose. They consist of the resinous bush called "tola," the fungus growth known as "yareta," and "taquia" or llama dung. The plateau region is virtually devoid of trees, and the cost of bringing firewood from the forested lowlands is prohibitive. Coal is not mined in Bolivia, and the cost of imported coal puts it beyond the reach of manufacturers. The product of the peat beds along the Yungas Railway near La Paz is used, so far, only for burning brick and tile. In spite of high prices, fuel oils are at present the most practicable source of factory power in Bolivia.

A greater development of the large water-power possibilities of the country would furnish the needed motive force for manufacturing enterprises. At present the cost of electric current is high in La Paz and Oruro, though more reasonable in Cochabamba. However, there exist, in the numerous streams that flow down the valleys on the eastern side of the Andes, vast reserves of hydroelectric energy. The potential power of these streams could not only serve for heating the plateau cities (a need keenly felt at present) but could supply the industrial enterprises of the country and be utilized for the electrification of its railway system, now dependent on coal.

ALCOHOL.

The trade in alcohol and spirituous liquors in Bolivia constitutes a monopoly, formerly farmed out to private interests, but now conducted directly by the Government. However, the production of these commodities and the retail trade in them is in the hands of private individuals. The original law establishing the Estanco de Bebidas Espirituosas, or Monopoly of Alcoholic Liquors, was passed in 1913 during the administration of President Montes. According to this law, the sale and distribution of alcohol and liquors might either be retained by the State or granted to some concessionaire. Beer and wines were excluded from the provisions of the law.

By law of May 14, 1912, a concession was granted to Simon Patiño, the tin-mining magnate, to form an Estanco de Alcoholes y Aguardientes Extranjeros for a period of four years from January 1, 1913—that is, until the beginning of 1917. A fixed annual sum was to be

paid to the National Treasury by the concessionaire. A law of March 26, 1914, modified the previous law to the effect that the Estanco would pay, after the first of 1914, 1,400,000 bolivianos a year in monthly installments. An alleged violation of the conditions of the concession, whereby Sr. Patiño sold to Portillo & Co., of Uyuni, in 1916, 200 cans of alcohol of 6 liters each, resulted in a serious disagreement between the Government and the concessionaire, who was fined 1,538,304 bolivianos.

Meanwhile, on January 23, 1918, a law was promulgated placing the monopoly in the hands of the State for a duration of four years. The administration of the monopoly was to be under the control of the Dirección General de Impuestos Internos y Renta de Alcoholes, or Internal Revenue Office. The law prohibited the private importation of foreign alcohol and liquors, except of denatured alcohol, but stipulated that the Government might import such articles to supply the deficiency from the national production up to the following amounts annually: 1918, 1,200,000 liters; 1919, 1,000,000 liters; 1920, 750,000 liters; and 1921, 500,000 liters. During the first half of 1918, the proceeds to the Treasury from this source amounted to 669,971 bolivianos. Most of the alcohol consumed that year was imported from Peru, through the agency of a Lima firm. However, the alcohol market was disturbed during that year by the existence of 82,000 cans which Sr. Patiño had not yet disposed of. The Government fixed the price of alcohol at 2.20 bolivianos per liter and placed a tax of 60 centavos and 20 centavos, respectively, on each liter of native alcohol and liquors, according to the grade.

The aim of the Government has been to stimulate the national production of alcohol and liquors and gradually to curtail imports to a point where they will be no longer necessary to supply the local market. Alcohol in Bolivia is produced from both sugar cane and cereals. In the Province of Cinti, in the Department of Chuquisaca, there are more than 600 distilleries, most of which, however, work on a very small scale. At Carapiri on the Rio Grande there is a large distillery belonging to José M. Linares, which uses the production of the cane fields of the neighboring river valleys. There are also distilleries in the Provinces of Oropeza, Yamparaez, Tomina, and Zudanez. The largest producer in the Department of La Paz is the Cañamina estate of the Sindicato de Bolivia, located in the Yungas region. This large establishment produces about 120,000 liters of alcohol a year. Other plants of the same kind in this region are owned by Flores Hnos. and Schuett & Cia., of La Paz. The Caracato, Luribay, and Araca districts of the Province of Loaiza also produce considerable quantities of brandies from grapes and peaches. The Charopampa property of Benedicto Goytia, which is located in the Mapiri district of the Province of Larecaja, contains large areas of sugar cane which are utilized for the production of alcohol.

In the Department of Cochabamba there are the following distilling plants: That of Saipaina Alta in the Province of Aiquile, belonging to Juan D. Cespedes and using sugar cane; the La Rinconada factory between Tarata and Cliza, belonging to the Fomento Agrícola and working on a basis of cereals; the Fábrica Nacional de Quillacollo, in the town of that name, belonging to Jose Urquidi; and the Fábrica de Changolla, in Sucre, which belongs to Juan C. Valdivia and uses cereals.

In the Department of Oruro, the only establishment of importance is that which belongs to Carlos Urquidi. The daily production of this plant is about 1,000 liters of alcohol.

The Department of Santa Cruz is an important producer of alcohol and brandies, because of the large extent of sugar cane grown there which can not be used for the manufacture of sugar. The introduction of Brazilian sugar into the Beni, which was formerly a market for Santa Cruz sugar, forced the Bolivian planters to utilize their production in the manufacture of alcohol for sale on the plateau. The heaviest producer is the "Las Barreas" establishment of Zeller, Villinger & Co., with a capacity of nearly 350,000 liters of alcohol a year. Other important producers are Vicente C. Gutierrez and Jose A. Justiniano. There are 241 establishments producing alcohol in the Department of Cercado. The second largest producing area is the Province of Sara. In 1918 the production of the Department amounted to 352,058 liters of cane brandy.

BEERS AND WINES.

Most of the larger cities of Bolivia have breweries, which are generally controlled by German interests. In La Paz are the Cervecería El Inca and the Cervecería Americana.

There are two breweries situated near the city of Cochabamba which produce a very good grade of beer. One of these, the Taquina, has a yearly output of nearly 100,000 dozen bottles, and the other, the Colón, produces about half that quantity.

The Cervecería Germania Calacala, at Oruro, which is capitalized at 170,000 bolivianos, produces about 200,000 liters of beer annually. There are also breweries at Potosi, Sucre, and Tarija.

Wine is produced at Muyurina, near Cochabamba, and in the Cinti district of Chuquisaca. At Muyurina the firm of J. C. Torres e Hijo produces about 20,000 liters of wine a year. However, this wine is still of inferior quality, and considerable quantities of adulterated Chilean wine are imported for the local market.

FLOUR.

A flour mill in Sucre, which is fitted with French machinery, is furnished with power by an American engine. The present capacity of the mill is about 2,600 pounds of flour per day; this will shortly be more than doubled. The flour is of excellent quality—probably the best produced in Bolivia—and compares very favorably with the imported Chilean product. The entire product of the mill is used in a modern bakery operated in the city, which is equipped with German bread-making machinery and uses nearly 2 tons of flour per day.

Wheat of good grain and head is produced in considerable quantity in the Cochabamba valleys, though the production per acre is not large. The wheat crop is harvested with the sickle and thrashed by driving oxen over the straw. Though most of the wheat is ground in the Department, some of the crop is sent to other points in Bolivia. There are numerous small flour mills, located near the base of the mountains, where they utilize the water power from mountain streams to operate a stone burr. The most modern mill in the Department is that of the Empresa Luz y Fuerza, which is situated within the

city of Cochabamba. There is one other mill of a similar character. The flour made by the smaller concerns is coarse, and some of it contains a fair proportion of bran. Except in the case of the better-grade flour produced by the two modernly equipped mills, the local product is mixed with imported Chilean flour. There should be a good field for flour milling on a large and modern scale in the locality of Cochabamba, where sufficient water power is available, and where the area sown to wheat could be greatly increased. The price of wheat ranges from 10 to 14 bolivianos per quintal. Imports of flour and wheat from Chile alone during 1918 amounted to, respectively, 13,806,775 and 318,575 kilos, with a total customs value of about 2,230,000 bolivianos. It is understood that a British importing firm plans the establishment of a large flour mill in Cochabamba.

CANDIES AND CHOCOLATE.

Candies, especially chocolate creams of excellent quality, are produced in Sucre. These chocolates are sold in a shoe store in La Paz, but the production is far from sufficient to supply the local demand. Bar chocolate is also produced in Cochabamba and Santa Cruz. In 1918, 28,328 kilos of candies were imported, and from all appearances a considerably larger quantity was imported during both 1919 and 1920. Though Argentine and Chilean candies are sold in Bolivia, the higher-grade goods in this line come from England and the United States. American confectionery, manufactured in California, is becoming a common sight in stores in the plateau cities.

SUGAR.

The sugar-refining industry, which is largely confined to the Department of Santa Cruz, is described under the heading of "Agriculture" (see p. 167).

MATCHES.

The exclusive privilege of manufacturing matches in Bolivia is held by the *Fábrica Nacional de Fósforos*, or National Match Factory. The monopoly is held by English interests, whose concession dates from 1917 and is to expire in 1927. The company operates on a capital of £88,000. The equipment of the factory is of American make. Both wax and wooden matches are made. By a law of 1912 the Departments of El Beni and Santa Cruz were excluded from the prohibition of the sale of foreign matches provided for in the concession to the "estanco," or monopoly. In 1918, 5,732 kilos of British and Brazilian matches were imported into the Colonias region through Cobija and Abuna.

There have been frequent complaints in Bolivia against the match monopoly, on the score both of the quality of its product and of the inadequacy of its output to supply the needs of the country. The former charge, particularly as regards the wooden matches, is unjustified, but there is no doubt that production at times has not been up to the demand for matches. The writer witnessed the working of a match famine in Sucre in April, 1920. In 1918 an effort was made in the Senate to annul the existing concession. The *Compañía Administradora*, or concessionaire company, is obliged to pay the Government the fixed annual sum of 70,000 bolivianos.

LEATHER GOODS AND TANNING.

In addition to the tanneries operated in connection with the two large shoe factories in Oruro and La Paz, there are several tanning establishments in the country. Among these is the Empresa Nacional de Curtiduría at Cochabamba, capitalized at 300,000 bolivianos, which produces a good quality of leather. In addition to a regular tanning business, the German firm of Freudenthal Hermanos in La Paz manufactures leather articles of a wide variety and leather clothing of a very good grade. The tanning of cowhides for sole leather is an important industry in the Beni country about Trinidad and in the region of Santa Cruz. Most of the product is sold in the cities of the plateau. Local tanning materials are used.

BOOTS AND SHOES.

The shoe-manufacturing industry is rapidly being developed in Bolivia to a point where it will be able to supply the entire national demand for footwear. The principal shoe factory at present is the Fábrica Nacional de Calzado, in Oruro. This concern belongs to Julio Zamora, who is one of the principal leaders of the Liberal Party and at the time of the revolution in July, 1920, was Minister of Finance. At that time Zamora was deported from the country and his factory temporarily closed. It was undoubtedly because of Zamora's strong influence in the Government that the import duties on shoes were placed on a protective basis. This business originally belonged to a Basque named Eliseteche, but was acquired by Sr. Zamora during 1917. The value of the business is said to be over 800,000 bolivianos. This concern has the exclusive right to introduce the product of the United Shoe Machinery Co. into Bolivia, though this privilege expires in 1923. A well-equipped tannery operated in connection with the plant supplies nearly all the leather used in the shoes. Other materials are largely bought in the United States, except the patent leather, which is now being imported from Argentina. The daily output of the factory is about 500 pairs of shoes. A large variety of styles is produced, some of them on up-to-date American lasts. Between 150 and 200 workmen are employed.

In 1917 another concern, García & Cia., began the manufacture of shoes, with American machinery bought at second hand in Buenos Aires and brought in by oxcarts over the Tupiza road from La Quiaca. This firm has built up a good business throughout the country and, like Zamora & Co., has exclusive retail agents in the more important cities. From 250 to 300 pairs a day are produced. In addition to these two firms, there is a considerable domestic production of shoes in small shops employing from two to six workmen.

NAILS.

In August, 1919, the Fábrica Nacional de Clavos, or National Nail Factory, began operations in La Paz. Half the stock of the company, which is capitalized at 120,000 bolivianos, is held by the manager, Antonio Agustin, and the other half is held by Fortunato Hermanos, a prominent firm of contractors and dealers in construction materials. Sr. Agustin is an Aragonese Spaniard, and the Fortunato brothers are of Argentine nationality.

The factory is equipped with three machines which were purchased at second hand in Chile and whose origin is unknown, as they bear no marks of the factory that made them. During 1920 some new equipment was ordered from the United States. The wire used is also imported from the United States. Fifteen sizes of ordinary steel builder's nails and 10 sizes of furniture nails, besides roofing nails, are made. The nails made appear to be of very good quality. The greatest difficulty that the factory has had to face has been the lack of competent and dependable labor. However, it is planned to bring in Chilean workmen in order to increase the output. To the end of March, 1920, only about 600 Spanish quintals (about 60,150 pounds) of nails had been turned out, which is estimated to be the national consumption of nails for two months.

Imports of wire nails into Bolivia for the years 1915-1918 were as follows: 1915, 116,504 kilos; 1916, 168,236 kilos; 1917, 237,034 kilos; 1918, 139,650 kilos. Imports by countries in 1918 were as follows: Chile, 55,635 kilos; United States, 55,312 kilos; Peru, 13,391 kilos; Brazil, 12,859 kilos; Argentina, 1,568 kilos; Great Britain, 661 kilos; and Uruguay, 224 kilos. Of other classes of nails there were imported, during 1918, 86,555 kilos; of these, 25,794 kilos came from Chile; 25,396 kilos from the United States; 21,717 kilos from Great Britain; 5,450 kilos from Sweden; 3,749 kilos from Argentina; 3,520 kilos from Peru; and the rest from Brazil and France.

In 1920 the duty on steel wire nails was fixed at 0.08 centavo per kilo.

This factory has also begun the making of mosaics for floors and paving, and it is intended to increase the production in this branch of the business. Artificial marble is also being produced, washbasins and sinks for kitchens being the only objects so far made of this material.

CIGARETTES.

The manufacture of cigarettes in Bolivia constitutes an "estanco" or monopoly of the National Government. By law of January 7, 1914, the Government decided to "farm out" to private interests the complete control over the manufacture and importation of tobacco in Bolivia. The contract for the "estanco" was let out to Nestor Villa, proprietor of the tobacco manufacturing firm known as "La Sucrense," and Federico Mauri & Cia., owners of the Compañía General de Tabacos. According to the arrangement made between the State and these interests, the latter were to form a corporation to be known as the Compañía Administradora de Tabacos, with a capital stock of 2,500,000 bolivianos. The Government was to have 60 per cent of the net profits and the concessionaires 40 per cent. By a subsequent decree of the Government the Beni district of the Republic was exempted from the control of the monopoly. This was done because of the difficulties of transportation between the plateau and the rubber country along the Beni and its tributaries, and also as a recognition of the ease with which contraband tobacco could be brought in from Brazil. In this region the German firm of Zeller, Villinger & Co., with stations at Riberalta, Trinidad, and other points has been endowed with the exclusive privilege of trading in tobacco. Virtually all the tobacco consumed in this region is

imported from Brazil, though some is produced in the Department of El Beni itself.

The net profits of the "estanco" during 1918 and the first half-year of 1919 were as follows: First six months of 1918, 476,113 bolivianos; second six months of 1918, 532,145 bolivianos; first six months of 1919, 521,537 bolivianos.

The tobacco used by the "estanco" for the manufacture of cigarettes is produced in the regions of Bolivia that lie to the east of the Andes. Of 195,499 pounds of tobacco used by the "estanco" during 1918, 110,010 pounds came from the Vallegrande district, which lies between Sucre and Santa Cruz, and 77,053 pounds were produced in the Azero and Tomina districts of the Department of Chuquisaca. The rest came from the Departments of Tarija and Cochabamba, with small quantities from the Department of Potosi. A fixed price is paid to the producers of these different regions by the agencies of the "estanco"—an arrangement that has caused great discontent among the growers.

No cigars are made by the "estanco," its production being limited to cigarettes and pipe tobacco. Four grades of cigarettes are made, which retail at, respectively, 10, 20, 30, and 40 centavos per package of 14 cigarettes. These cigarettes are very strong, but otherwise of good quality.

The most important of the several cigarette factories of the "estanco" is situated at Sucre. It is a clean and well-lighted establishment, equipped largely with British machinery, though there are a few French and German machines. More than 60 workers are employed. During the second half-year of 1919 there were manufactured here 2,707,300 packages of cigarettes, out of a total of 3,732,050 packages made in all the factories of the "estanco." In addition, 2,087 pounds of pipe tobacco were produced.

Imports of tobacco in various forms during the years 1914-1918 were as follows:

Years.	Leaf tobacco.	Pipe tobacco.	Cigars.	Cigarettes.
	<i>Kilos.</i>	<i>Kilos.</i>	<i>Kilos.</i>	<i>Kilos.</i>
1914.....	2,416	920	727	934
1915.....	1,494	616	1,325	1,739
1916.....	1,436	2,143	1,002	1,775
1917.....	1,287	2,095	1,433	3,635
1918.....	432	1,470	2,835	3,788

NOTE.—The increases or decreases in the five-year period were: Leaf tobacco, decrease of 78.75 per cent; pipe tobacco, increase of 59.63 per cent; cigars, increase of 227.81 per cent; cigarettes, increase of 304.78 per cent.

All the leaf tobacco imported into Bolivia is brought in from Brazil by the Amazon route and entered at Cobija and Abuna. Of the pipe tobacco imported in 1918, 811 kilos came from Great Britain and the remainder from Brazil. Imports of cigars were distributed as follows: Cuba, 1,756 kilos; Brazil, 375 kilos; Netherlands, 248 kilos; Argentina, 5 kilos; United States, 1 kilo. Brazil furnished 2,697 kilos of the total imports of cigarettes, largely for the Beni-Mamore region; Cuba, 892 kilos; Great Britain, 188 kilos, and the United States, one-half kilo. Though the United States held

a negligible place in the tobacco trade of Bolivia during this period, American cigarettes and pipe tobacco have begun to enter the market in increasing quantities in 1919 and 1920. The customs values of imports of tobaccos during 1918 were as follows: Leaf tobacco, 518 bolivianos; pipe tobacco, 1,764 bolivianos; cigars, 13,357 bolivianos; cigarettes, 15,900 bolivianos; total, 31,539 bolivianos.

Leaf and pipe tobaccos imported into Bolivia pay a duty of 4 bolivianos per kilo. Cigarettes pay a duty of 5.50 bolivianos per kilo, while cigars pay 7 bolivianos per kilo.

The existence of the "estanco" constitutes the greatest obstacle to the development of a market in Bolivia for foreign tobaccos. Whatever foreign tobaccos are sold in the country are imported by the "estanco," which in turn sells to the local retailers. Most of the foreign cigarettes sold are packed in air-tight tins of 50 or in packages of 10. The smaller packages of the standard brands on sale retail at 1 boliviano, though the most popular American brand on the market sells at 1.20 bolivianos. The demand for cigarettes of this kind is limited to the American and British communities, travelers of the same nationalities, and the more well-to-do Bolivians. Probably 60 per cent of the native Bolivians do not smoke at all. This is largely due to the wide use of coca among the Indian population.

WOOLENS.

It is probable that almost 1,000,000 pounds of wool are used annually in Bolivia for the manufacture of the woollen stuffs worn by the natives. There are no manufacturing plants engaged in the production of woollens on an industrial scale, as in Peru, but a local company was formed in 1920 for that purpose. However, nearly all the Indian women of the country districts engage in weaving woollen shawls, ponchos, and other articles of wear. Some very fair cloth for suitings is also made, the clothing worn by the cholo class being largely made from this domestic material. The equipment used in weaving is of a very primitive sort.

LABOR CONDITIONS.

Through various phases of labor in Bolivia have been discussed under other headings, some factors in the situation remain for consideration. Racially, Bolivian labor is either Indian or cholo, and so naturally shares in the characteristics of these two ethnic elements. In intelligence the cholo is distinctly superior to the Indian, whose naturally none-too-active mind is further clouded by his chronic addiction to coca chewing. However, though both the Indian and the cholo are slow workers, the cholo surpasses the Indian in initiative and in possessing the elements of ambition and curiosity that make him a more progressive and adaptable workman. Thus he is capable of attaining to considerably higher efficiency and skill as a mechanic. Though the cholo is superior in these respects, the Indian, who has had his spirit of assertiveness crushed out by centuries of subjection to authority, is more amenable to control and discipline and is, moreover, more generally dependable. His honesty is usually above reproach. However, on feast days he generally drinks to such an extent that it requires several days for him to recover. Yet the Indians comprise the great mass of unskilled laborers in the cities, on the farms, and in the mines.

Because of their caste prejudice against manual labor, there are very few whites among the working class of Bolivia. There is little place for foreign labor, except in places demanding special skill. In any other lines, foreign laborers can scarcely compete with the cheap, if less efficient, native labor. It must also be remembered in this connection that the physical efficiency of foreign labor is considerably less in these high altitudes than at sea level. The only field for the immigration of hardy foreign workmen would be in special construction enterprises, as in the building of railways. The native labor supply is small, and this condition is somewhat aggravated by the migration of Bolivian workmen to the nitrate fields of northern Chile. Moreover, the normal rate of increase of the population is small, especially because of the high infant mortality among the lower classes.

The initiation of a large enterprise which offered employment to a few thousand men at wages a little higher than the current scale of pay in the country would seriously disturb the national labor market. This very circumstance occurred in 1920, causing a dearth of workmen on jobs already under way, as on the construction of the Yungas Railway.

Current wages in several lines are as follows: Masons, 5 to 6 bolivianos a day for a 9-hour day; carpenters, 6 to 7 bolivianos, 9 hours; blacksmiths, 6 to 7 bolivianos, 9 hours; street railway motormen, 120 bolivianos for month of 15 days; street railway conductors, 100 bolivianos for month of 15 days; store clerks, 60 to 100 bolivianos a month, for day of 8 or 9 hours. In one of the stores employees are paid from 120 to 180 bolivianos.

Labor is not highly organized in Bolivia. In only a few lines are there "gremios," or associations of workmen, though the present tendency is distinctly in that direction, especially among the more skilled workers. The employees of the Bolivia Railway probably have the strongest association in the country, partly because of their close connections with their fellow workmen on the Chilean section of the through line from Antofagasta.

Until recently, strikes were unknown in Bolivia. However, in 1919 there was a strike at the Llallagua tin mines, and there was a strike of the telegraphers on the Government lines in 1920. There have also been difficulties with labor on the Bolivia Railway system.

COLONIZATION IMMIGRATION, AND LANDS.

Matters connected with colonization of public lands in Bolivia are now under the jurisdiction of the Minister of War and Colonization, though the portfolio of Colonization was formerly more appropriately associated with that of Agriculture. A bureau of the joint ministry known as the "Section of Colonization" has charge of colonial affairs. Formerly the prefects of Departments and the delegates of the national Territories were endowed with considerable jurisdiction in questions regarding public lands, but authority is now largely concentrated in the hands of the ministry at La Paz. Inquiries for information regarding public lands should be addressed: "Jefe de la Sección de Colonización, Ministerio de Guerra y Colonización, La Paz." A copy of the compiled statutes and decrees on the subject may be consulted at the Bureau of Foreign and Domestic Commerce, by referring to "Legislación de Tierras Baldías." Maps prepared by the cartographical department of the Public Land Office showing lands ceded are on file in the Latin American division of the Bureau of Foreign and Domestic Commerce.

FUNDAMENTAL LEGISLATION—ZONES SET ASIDE FOR COLONIZATION.

Though temporarily suspended since September 11, 1915, the fundamental colonial legislation of Bolivia consists of the law of October 26, 1905, generally known as the "Ley de Tierras Baldías del Estado." At that time Ismael Montes was President of the Republic, and Manuel Vicente Ballivian was Minister of Colonization and Agriculture. This law superseded such previous dispositions as those of November 13, 1886, and December 10, 1895. The "reglamento" or regulatory decree, which provided for the enforcement of the basic law and interpreted its provisions in detail, was issued on June 20, 1907. According to the law of 1905 any Bolivian citizen or foreigner capable of assuming the obligations of the civil law of the Republic might buy from the State public lands to a maximum extent of 20,000 hectares. For these he was to pay at the rate of 10 centavos per hectare, in case the lands were agricultural or pastoral. This would amount to 2,000 bolivianos for 20,000 hectares, or at the rate of about \$775 per 49,400 acres. If the lands acquired contained rubber-bearing trees, the price was to be 1 boliviano per hectare. The purchasers were obliged to settle at least one family on each 1,000 hectares of land. Sales of land in excess of 20,000 hectares might be obtained only with the express consent of the National Congress. Provision was made for locating and demarking each lot by two surveyors, one of whom was to be in the service of the Government and the other employed by the buyer, unless the latter agreed to accept the survey made by the public surveyor. The sale of lands under this law was placed in the hands of the executive branch of the Government, in effect the Ministry of Colonization, and of the national delegates in the different frontier districts. The

"reglamento" of 1907 provided that proposals for the purchase of lands might also be made directly to the prefect of the Department in which the lands lay.

Before the passage of the fundamental law a decree of April 25 of the same year set aside for purposes of colonization the following zones of the Republic:

A. Territory of Colonias, 17,250 square kilometers.—The southeastern part of this territory bounded by the Tambopata River from its confluence with the San Blas to its mouth in the Madre de Dios; the Madre de Dios to its junction with the Heath; the line that joins this point with the confluence of the Chunini and Madidi Rivers; and the course of the latter river to its source in the mountains.

B. Department of La Paz, 14,500 square kilometers.—The region in the Province of Caupolicán between the Rivers Beni, Madidi, and Sayuba and the chain of mountains separating the sources of the last two streams.

C. Department of El Beni, 12,850 square kilometers.—The area in the Province of Itenez lying between the Mamore and the Itenez, the meridian 64° west of Greenwich, and the parallel 13° south.

D. Department of El Beni, 17,000 square kilometers.—This zone lay in the same Province, and comprised the country between the Rivers Paragua and Itenez-Guapore and the limits of El Beni with the Department of Santa Cruz.

E. Department of Cochabamba, 18,500 square kilometers.—This region consisted of the basins of the Rivers Isiboro and Secure, in the Provinces of Ayopaya and Chapare.

F. Department of Santa Cruz, 92,800 square kilometers.—This large tract of land lay in the Provinces of Velasco, Chiquitos, and Cordillera. The first and northern section comprised the region between the River Paragua, the boundary of zone C, the River Verde, and the Brazilian frontier. The central section of the zone comprised the lands situated between the Rivers Sapocos, Oriental, San Miguel, and San Luis and the highlands in which they rise. The third and southeastern section comprised the basin of the River Otquis, the highlands of San Juan and Sunsas and the land about the headwaters of the Rivers San Fernando, Santo Corazon, and La Calque, which rise in the Sunsas Hills.

G. Department of Chuquisaca, 67,750 square kilometers.—This zone comprised the central and eastern parts of the Province of Azero.

H. Department of Tarija, 30,250 square kilometers.—This zone embraced the lands in the Province of Gran Chaco lying between the twenty-first parallel, the Pilcomayo River, the sixty-first meridian, and a line running parallel to the Pilcomayo at a distance of 111 kilometers (69 miles) from that river.

SMALL BENEFIT TO STATE—SUSPENSION OF ORIGINAL LAW.

Under the provisions of the law of 1905 fiscal lands were granted with such reckless prodigality that the Government at last took alarm and, by law of September 11, 1915, suspended entirely the operation of the former law. The only recourse left to persons desiring to acquire public lands was by petition to the National Congress, a slow and costly process. The time first allowed for the perfection of titles was successively extended to the end of 1920.

To the middle of 1919 final titles had been granted to the following extents of territory:

Department:	Hectares.	Department (continued):	Hectares.
Chuquisaca.....	527,691	El Beni.....	1,233,100
La Paz.....	282,947	Territory of Colonias.....	4,610,051
Cochabamba.....	649,437	Territory of the Chaco...	2,373,743
Potosi.....	30	Territory of Oriente.....	497,537
Tarija.....	272,137		
Santa Cruz.....	2,979,877	Total.....	13,426,550

Nearly all the lands sold in the Territory of Colonias were acquired by the great rubber interests of Suarez Hermanos. The German firm of Staudt & Co. acquired more than 1,000,000 hectares along the Pilcomayo, but have failed to perfect their title to another large area

to which they had pretensions. Manuel Peña was granted 1,462,500 hectares in the Paragua Basin of the Department of Santa Cruz.

The small benefit to the State from these cessions has been entirely disproportionate to the vast extent of the lands ceded. In the Supreme Decree of May 22, 1915, President Montes declared that "the innumerable holdings granted up to the present, with no other requirements than priority of claim and the payment of 10 centavos per hectare have in no way favored colonization, much less aided the agricultural and pastoral development of the lands ceded." And in 1919 José S. Quinteros, Minister of Colonization, said: "The law of October 26, 1905, had an effect opposite from that hoped for in the original plan of colonization, giving rise to the exhaustion of the fiscal lands, which have passed in vast areas to dead hands. These constitute veritable latifundia, that are of no advantage to the nation, since they remain uncultivated. * * * The concessionaires hold their estates with the sole object of reselling them to foreign enterprises, from whom they expect to receive fat profits." The insignificant tax of one-half centavo per hectare levied on lands sold for purposes of colonization was not sufficient to force the owners to develop their holdings.

ESTABLISHMENT OF THREE NATIONAL TERRITORIES.

One of the principal objects in the establishment of the three national territories of Colonias, Gran Chaco, and Oriente was the promotion of colonization in those vast undeveloped regions of the Republic. The first of these was organized as the Territory of the Colonies of the Northwest (Territorio de Las Colonias del Noroeste) by a law of October 28, 1890, for the government of the region of the Acre and the Madre de Dios. For a time it was administered from Riberalta in the Beni, where the delegate had his headquarters, but the seat of government was later moved to Cobija on the Acre. In this region everything else has been subordinated to the extraction of rubber, and little effort has been made by such interests as Suarez and Braillard to colonize the State lands that they have acquired there. In fact, most of the new settlers have been Brazilians, whose persistent loyalty to their country of origin has been a cause of serious concern to the Bolivian Government, which is still mindful of its experience with the lost Acre country.

The "Delegación," or Territory, of the Oriente was created by law of January 11, 1911, from the eastern part of the Department of Santa Cruz, and with the seat of administration at Puerto Suarez. The duration of this territorial government has been twice prolonged, finally to January 4, 1924. Most of the lands granted under the law of 1905 have been located along the Puerto Suarez-Santa Cruz trail or to the north of this route. The few colonies settled with Bolivians at Puerto Suarez, Villazonia, Warnes, and Robore have not flourished to any degree. The very town site of Puerto Suarez belonged to the German Sociedad Comercial Matto Grosso y Bolivia, from which the settlers were obliged to acquire their lots. The Belgian Sociedad Belgo-Sudamericana has a large program for the north-eastern part of the Territory, with Laguna Caiba as an outlet to the Paraguay River.

The Territory of the Gran Chaco was established by law of December 27, 1905, for a period of five years, but this period has been twice extended. It comprises the little-known country to the left of the lower Pilcomayo River. Though a matter of dispute with Paraguay, Bolivian occupation of this region has become increasingly effective. Villa Montes on the Pilcomayo represents an effort of the Government at national colonization, and efforts have been made to induce natives of the country to settle about the "fortines," or garrison posts, along the Pilcomayo. Strips of land facing on that river have been granted, but little has been done toward serious development, though increasing numbers of cattle are being raised. Liability to droughts and to inundations at the different seasons of the year has been an obstacle to the settlement of an otherwise good region.

LAW GOVERNING IMMIGRATION.

The basic law governing immigration into Bolivia is contained in the supreme decree of President Montes of March 18, 1907. The sole qualifications fixed for immigrants desiring to avail themselves of the Government aid provided for by the law were that they be workmen, farmers, or manufacturers less than 60 years of age, and that they give evidence of good character and fitness. The immigrant who satisfied these conditions might enjoy the following privileges:

(1) Free passage within Bolivia to his destination over the railways and public roads of the country—this including the immigrant's wife and sons over 18 years of age.

(2) Freedom from customs duties for his personal belongings, including tools and implements.

(3) The right to acquire 50 hectares of State land at a price of 10 centavos per hectare, each son over 14 years of age to have the right to an additional tract of 25 hectares.

Payments for land might be made either at the time of occupation, or in five annual installments of 1 boliviano each. Sons over 18 years of age were permitted to acquire a lot of 50 hectares on their own account. After a period of three years and after perfecting the title to his first tract of land the immigrant might buy two additional lots. The law constituted all Bolivian consulates as agencies for supplying information to prospective immigrants. A special section was created in the Ministry of Colonization and Agriculture, to be known as the Oficina de Trabajo, or Labor Office, for carrying out the provisions of the immigration law.

RELATIVELY SMALL NUMBER OF IMMIGRANTS.

The law of 1907 has had few definite results. The Government has lacked the means to carry out the feature of immigrant aid provided for in the law, and in attempting to attract bona fide immigrants has had to compete with countries like Brazil and Argentina, that are more favorably situated in this respect. Bolivia has also suffered from the disadvantage of its inland position, the lack of an accurate cadastral survey of its public lands, and the lack of markets for the regions that are open to immigration. These regions combine great natural advantages, but because of the lack

of transportation facilities the natural riches of the vast eastern plains can find no outlet. Those who settle in that part of Bolivia can hope for a living, but for many years they can expect little more than a bountiful supply of food for their consumption. Only single men should settle in this region, unless the immigrants are from countries where women of the rural populations are accustomed to hardships.

A few Japanese have gone into Bolivia from Peru by way of the Madre de Dios and settled in the Beni. Some Brazilians have crossed into Bolivia from the Acre and Amazonas regions to engage in the rubber industry. There has been a small immigration of Argentinians in the south, and a small number of Chileans have entered Bolivia to work in the mining regions. A handful of Americans have settled in the Santa Cruz and Chiquitos country. But there has been no real immigration on any appreciable scale.

As for the plateau, no State lands remain there for sale to immigrants. There are undoubted opportunities for the breeding of live stock, including hogs about Lake Titicaca, cattle in Carangas, sheep in several districts, and mules in the valley of Mizque. However, the inhospitable appearance of the country or its unhealthfulness (as in the Mizque region) discourage foreigners from settling there. Land must be acquired by private purchase, and, as everywhere in Bolivia, there is no regular land market or dealers in real estate. A foreigner desiring to buy land on the plateau would have to settle down in La Paz for a time, advertise, and make inquiries, and even should he encounter a tract of land for sale it would most probably be difficult to agree on a reasonable price with the owner.

TRADE.

THE BOLIVIAN MARKET.

In gauging the purchasing power of the Bolivian market it is necessary to take into account the peculiar racial composition of the nation. The population is predominantly Indian and mestizo, and the general level of the standard of living is correspondingly low. The Indian buys few imported goods beyond some ordinary textiles, hardware, dyes, and cheap notions. Moreover, this is a field that will admit of little expansion unless the Indian's earning capacity and standard of living undergo a radical change, which is very unlikely for some time.

In these respects the general level of the mestizos or cholos is considerably higher than in the case of the Indians. However, there are wide differences between the various degrees of cholos, whose condition merges on the one hand into that of the Indians and on the other approximates closely to the status of the whites. The income of the men of this class varies from about \$15 to \$45 a month. Those who work as skilled laborers or are engaged in business on their own account may make more. The woman of the family is also very often an earner, and it is common for the boys to begin work at 10 or 11. In spite of its limited earning capacity, the cholo class takes a wide variety of imported goods and is constantly demanding a higher grade of merchandise. In addition to hardware and textiles, they buy large quantities of foreign foodstuffs and groceries, not only such items as rice, sugar, and tea, but also prepared foodstuffs, such as canned goods. Though the cholos are not buyers of foreign shoes, they take most of the low and medium grades of wearing apparel imported into the country. Some of the women of this class also wear expensive silk shawls. They are good buyers of prepared medicines and are prone to spend a disproportionate share of their income for talcum powder, perfumes, and other toilet articles. They are also inclined to buy cheap and showy jewelry.

The whites, who form a minority comprising not more than 20 per cent of the total population, are the sole buyers of the higher grades of imported merchandise. However, it is doubtful whether there are 10,000 families in Bolivia with an annual income of \$1,800. There are probably not more than 50 families with an income of \$10,000 a year. The persons comprising this minority have tastes and standards of living more or less on a plane with those of the same rank in any modern society. They dress uniformly well, they furnish their homes with increasing comfort and good style, in contrast to the former barrenness of South American houses, and they have become accustomed to a greater variety of diet at their tables, calling for a good grade of foreign foodstuffs. They are constantly demanding more of the so-called nonessentials and luxuries.

The annual per capita consumption of foreign goods in Bolivia is between \$15 and \$25. It is easy to overload such a market in most lines of merchandise. Local importers, as well as foreign exporters, are liable to overestimate the quantity of a given commodity that this market can absorb. The inability of importing houses to dispose of unduly large orders of foreign goods has sometimes furnished a pretext for their protesting the drafts for the payment of such unsalable merchandise. It must be remembered that only in a few lines, like cottons, ordinary hardware, and such foodstuffs as rice, flour, and sugar, is the demand even remotely commensurate with the numerical size of the buying population.

BUSINESS INTERESTS.

As in most parts of South America, the native of the country holds a relatively unimportant place in the commercial life of Bolivia. With the exception of a few firms, including those of Ormachea, Urriolagoitia, Jorge Saenz, Arauco Prado, and Portillo, the majority of the general importing and exporting interests are foreign. Bolivians are better represented in retail business, where there are some very substantial houses, like that of José M. Carballo in La Paz.

American commercial interests in Bolivia are represented by such general trading houses as those of Denniston, Pringle & Velez, and Kelly & Fletcher. The important house of W. R. Grace & Co., though its base of operations is in New York, has a large British personnel, and the manager of its Bolivian business is a native Bolivian long prominent in promoting the industrial interests of his country. There are several important British importing and exporting companies, including those of Duncan, Fox & Co.; Graham, Rowe; Williamson & Co.; and Mason Bros. The list also includes the names of R. G. Williams and the Anglo-Bolivian Rubber Estates (Ltd.), which carry on a general merchandise business in eastern Bolivia in addition to their rubber operations. The largest dealer in men's furnishings in La Paz (A. G. Thompson) is British, as is the best pharmacy in Oruro, the "Botica Inglesa." Among houses of French nationality are those of Levy (La Paz), Étienne (Oruro), and Picollet (Beni).

The Germans have long held a prominent place in Bolivian business. The high position held in imports into Bolivia before 1914 was largely due to the strong local representation which the Germans had built up. Though the war and the operations of the Allied "black list" gave a setback to the development of this trade, the German houses in Bolivia maintained their organization and by 1920 showed signs of recovering much of their former importance. Though these houses covered the entire country, their activities were especially evident in eastern Bolivia. The Germans had virtually sealed up the interior country by controlling the approaches to that market, as well as establishing trading houses at such interior points as Trinidad and Santa Cruz. At Riberalta in the Beni were the houses of Zeller-Villinger and Barber; at Puerto Suarez were Zeller-Villinger and Stauffen, Schnack, Müller (Sociedad Comercial Matto Grosso y Bolivia); and at Yacuiba and Villa Montes were the stores of Staudt & Co. At Cochabamba there were a number of German houses which worked the

Beni and Santa Cruz regions. At present there are a dozen German importing and exporting houses in that city. These include the firms of Barber, Hardt, Gildemeister, Boettiger-Trepp, and Colsman-Boehme, which also have branches in other Bolivian cities. In addition to these, there are several purely local firms. The largest hardware concern in Bolivia is that of G. Hinke, which has stores in La Paz, Cochabamba, and Oruro.

There are several other German hardware stores, particularly in Oruro.

A considerable number of Spaniards are engaged in retail business. Their favorite lines are groceries and men's and women's furnishings. Some of the leading stores in La Paz of this kind are Spanish owned. These include the firms of Pablo Saenz, Rodriguez Hermanos, Coca Jimenez, Mesa Moron, and Flores.

The Spanish commercial interests of La Paz are organized in a chamber of commerce. Most of these Spanish houses enjoy an excellent reputation for credit and general reliability.

The so-called "Turk" element, which comprehends all classes of Levantines, including especially Syrians and Armenians, has gained an important place in the dry-goods and notions trade in all parts of Bolivia. They are particularly prominent in La Paz, Oruro, and Potosi, where they operate numerous small bazaars or shops. One block of Calle Diez de Medina in La Paz is almost entirely taken up with these "Turk" "tiendas."

The Jugo-Slavs have come to hold a similar place in the grocery business in several cities, especially in Oruro and Potosi, where they now have a virtual monopoly in that line of trade. They are also branching out into the hardware business and a few are doing a general importing and exporting business.

The Italian element is of comparatively small importance in Bolivian business though there are a few houses like those of Catorretto and D'Andreis.

Of South Americans, there are a number of Peruvian stores in La Paz, but most of them are shops that do a small business. Peruvian interests suffered from the riots of April, 1920, which led to an exodus of Peruvians from Bolivia. However, with the restoration of friendly relations between the two Governments, the Peruvians have begun to regain their old business. There are a few general importing and exporting houses of Chilean nationality, including those of Barrios and Valenzuela. The important construction material firm of Fortunato Hermanos is Argentine, and some Argentines are doing business in Tarija. The leading business interests of La Paz are organized in a Cámara de Comercio, or chamber of commerce, with headquarters on Calle Recreo.

The American business colony was also organized in 1919 as the American Chamber of Commerce in Bolivia. This organization, which consists of about a dozen firms, has well-furnished quarters adjoining the American consulate in the Edificio Taborga.

CHARACTER OF STORES AND BUSINESS BUILDINGS.

A very manifest improvement is going on in La Paz in the quality of the stores. Many of them are now very well housed. The better shops on Calle Comercio, such as the Louvre (which lacks little of

being a real department store), the Sultana, the Bon Marché, and the Casa Ortiz, carry good lines of merchandise and are well and attractively arranged. Window decorations are used to an increasing extent. These stores carry general lines of wearing apparel, dry goods, china and glassware, and household furnishings, but deal especially in dry goods. This class of store is generally called a "tienda" in Bolivia, as grocery stores are often referred to as "almacenes." There are at least two first-class groceries in La Paz, and there are also several up-to-date drug stores. These pharmacies carry toilet articles in addition to drugs and medicines. There is an excellent drug store in Oruro. La Paz also has three or four modern men's furnishing stores, which carry good stocks and present their goods in attractive form. Most of the smaller stores in La Paz are housed in dingy buildings that are unsuited for the purpose. Goods, especially bolts of cloth and samples of ready-to-wear clothing, are hung out in front to attract buyers within. Part of Calle Diez de Medina, which is lined with "tiendas" displaying bright-colored goods, has the appearance of an Oriental bazaar street. The stores in the smaller cities of Bolivia, especially in Potosi and Sucre, present a distinctly inferior aspect, though there are unmistakable signs of improvement in Oruro and Cochabamba. Little construction of modern business buildings has taken place in any of these places. In the smaller towns the stores are largely general-merchandise establishments that sell groceries (including canned goods), cottons, ordinary hardware, and such other goods as would be required by a cholo and Indian trade. Numerous small shops, or "pulperías," which largely trade in groceries, are found everywhere throughout the country.

BUYING METHODS.

Merchants in Bolivia either make their purchases direct from the exporter or through commission houses established within the country. Those who use the former method order by mail, through traveling agents of the exporter, or by personal visits to the United States or Europe. However, the majority combine two or all of these methods. Many prefer to deal as directly as possible with the manufacturer, in order to save the difference between the original price and the price offered by the commission house. The unfortunate experiences which a few Bolivians have had with some irresponsible jobbing houses in New York have tended to prejudice them against all general exporting houses, however reliable they may be. It may be added here that there is a tendency to trade with New Orleans and Pacific coast houses more largely than in the past.

American exporters are using catalogues to an increasing extent in their efforts to reach the trade of Latin America. These catalogues and the American trade periodicals comprise the best commercial propaganda material that now reaches Bolivia from any source. However, too many catalogues in English are still sent. This applies to price lists as well, which should always be drawn up in Spanish and in as simple form as possible. The indiscriminate sending of catalogues is poor policy; trade literature should be sent only to such firms as offer a reasonable prospect of orders. Manufacturers desiring to keep in touch with the Bolivian field would do well to send

copies of their catalogues to the American consulate or to the American Chamber of Commerce in La Paz. Under no circumstances should bulky packages of trade literature or samples be sent through the mail, or by parcel post, unless a previous arrangement has been made with the addressee. Otherwise the latter is liable to be put to a great deal of trouble in getting the packages out of the customhouse. This may require a couple of hours' work and the expenditure of several bolivianos for fees. When, after all this, the recipient finds that his package contains only some bulky catalogues, he is likely to be irritated. For this reason trade literature for circulation in Bolivia, as in other parts of South America, should be kept within mailable size.

Advertising has not been resorted to in Bolivia to the same extent as in some other South American countries. There are no regular advertising agencies covering the country, but each firm handles its own publicity work. Consequently there is little attractiveness or originality in advertising. Though considerable space is given to advertisements in the daily newspapers, these are not satisfactory publicity mediums. Their circulation is small, ranging from 1,000 to 5,000 for the La Paz papers, and, as no cuts are used in connection with advertisements, their appeal is limited. The principal weekly periodicals are the *Atlantida* and the *Boletín Comercial*. The former is an illustrated weekly, but also contains comments on current happenings. It is edited by Sr. Eduardo Diez de Medina and is published on Calle Yanacocha, La Paz. Its advertisements are superior to those of any other local publication. The *Boletín Comercial* is a purely commercial weekly of about 46 pages. Almost half this space is given up to advertisements, chiefly in the form of business cards of local firms. The editors, whose post office address is Casilla 206, La Paz, are Julio Beitia and José E. Rivera. Sr. Beitia is of Chilean nationality, and Sr. Rivera is a Bolivian. The yearly subscription price for foreign countries is 25 bolivianos. The weekly circulation is about 2,000 copies.

A few foreign periodicals also circulate in Bolivia, though to a very limited extent. Among such American periodicals are the Spanish edition of *Pictorial Review* and the agricultural monthly, *La Hacienda*. The *Revista del Mundo*, the Spanish edition of *World's Work*, published by *La Nación* of Buenos Aires, is also sold in Bolivia. These make very good publicity mediums for American goods.

There is little display advertising in Bolivia, and this little is not very effective. The high cost of lumber prevents the use of sign boards, but certain conspicuous wall spaces are utilized for advertisements in two colors and without illustrations. Though the American street cars used in La Paz contain space for advertising cards, seldom more than two or three cards are ever seen in a car. American exporters could aid the sale of their goods in La Paz by sending street-car cards with illustrations and Spanish wording to their Bolivian clients. There is little screen or curtain advertising in the local theaters. It may be added here that the predominance of American films in the motion-picture theaters of Bolivia is a strong factor in giving publicity to articles of American manufacture. The high price of current prevents the use of electrical advertising. Cards and calendars with attractive lithographic work and Spanish

wording make excellent advertising material either for window or store display or for distribution. (However, in view of the climate of Bolivia, cardboard fans for advertising purposes should not be sent.) Publicity material of this character is always welcome, and in most cases merchants would be willing to pay an additional charge to cover the cost of such material. Bright colors and illustrations are the principal requisites of advertisements of this kind, as the quick visual appeal is what should be sought in reaching this trade. The effect of highly colored pictorial advertising can scarcely be exaggerated, though advertisements of this character must be definitely connected in the mind of the buying public with the particular commodity that is being advertised. That is, some feature, such as the trade-mark, should appear on both the advertisement and the article advertised.

Whenever possible, correspondence with Bolivian importers should be in Spanish, though good English is preferable to bad Spanish. If there is no one in the importing house who can read English, the letter must be sent out for translation or someone brought in from outside to decipher it. On the other hand, a letter written in bad Spanish gives an unfavorable impression of the firm that sent it out. Though letters should not be curt, neither should they be needlessly long. However, it should be remembered that South American merchants are very susceptible to the tone in which a letter is written and are highly appreciative of courtesy. One La Paz merchant showed a very considerate letter from an American exporter, which had greatly pleased him, and remarked: "People who treat us like that can have our business as long as they want it."

Bolivian merchants are going in increasing numbers to the United States and Europe to make their purchases. Such commercial trips to the United States should be encouraged, and those making such trips should be shown every facility and courtesy. It is of great importance that these men be given an opportunity to go through industrial establishments in the lines in which they are interested. Those who have been received in this manner carry back favorable impressions of what they have seen and a predisposition toward American goods that is a real asset for our foreign trade. It is unfortunate that they are compelled to pay the large fee of \$10 for the American visé of their passports before embarking for the United States. This high charge appears to them a needless exaction and is a source of irritation to a class of men whose good will should be cultivated in every way.

TRAVELING SALESMEN.

The third method of making purchases is through traveling agents of the exporting houses. Formerly few American salesmen visited Bolivia, but they are now frequently seen in La Paz and even in the smaller cities. During 1920 the writer met half a dozen in La Paz at one time. This method of reaching the trade has given very satisfactory results, especially when the salesman is fitted for this kind of work. This requires not only ordinary selling ability, but a little more courtesy than may be essential in the United States and a manner that impresses the prospective client with the traveler's own reliability and that of his firm. Though not absolutely necessary in

all cases, a speaking knowledge of Spanish gives a salesman an advantage whose value it is needless to insist upon.

A man covering the west coast in any standard line could profitably spend from two weeks to a month or more in La Paz and a few days each in Oruro and Cochabamba. In certain lines a short trip into Potosi might be advisable. Sucre is less readily accessible.

The principal obstacle to the activities of foreign traveling salesmen in Bolivia is the vexatious system of license taxes levied by the different municipalities. These are entirely local in character, being levied only in the particular city where paid. They are not only very considerable in amount, but for a salesman who desires to cover several cities the payment of the aggregate sum of licenses may well prove a severe drain on his profits from sales or actually leave him with a deficit. Salesmen who plan a trip to Bolivia should carefully calculate the relation of this expense to the prospective results of their sales campaign, so as to insure themselves against a loss. However, it must be remembered that in cases where the salesman feels confident that the future business in store for his house will justify the initial outlay, there should be less hesitancy in incurring the expense of license fees. The following table shows the scale of license fees levied in the principal commercial centers of Bolivia:

Bolivianos.		Bolivianos.	
La Paz.....	250	Santa Cruz.....	400-800
Cochabamba.....	1,000	Tarija.....	200
Oruro.....	250	Tupiza.....	200
Potosi.....	200	Uyuni.....	250
Sucre.....	300		

It is the custom to farm out the collection of this tax to the highest bidder, though it is sometimes administered directly by the city government. Salesmen should call at the "impuestos," or tax, office of the "Municipalidad," or city hall, for information regarding the method of payment, or they may secure this information at the American consulate. The tax concessionaire is allowed considerable latitude in the assessment of the tax, and it has sometimes been found possible to secure a very substantial reduction of the fee by careful bargaining and by holding out the prospect of leaving the city without paying any tax whatever, even at the sacrifice of transacting no business. Payment may also be evaded by operating as representative of the salesman's own agency in the country. Thus the traveler grants the representation for his firm to some local concern and in turn carries on his sales campaign in the capacity of agent of the latter. However, this requires, in the first place, special care in the selection of an agency, as the agreement made with the local firm would probably continue after the salesman's departure. Also, unless skillfully handled this procedure may lead to trouble with the local authorities, whom it is sometimes difficult to impress with the bona fide character of the arrangement. The salesman's license is valid for a year, and there are no further restrictions on the holder during that period.

Local merchants in Bolivia generally welcome the visits of salesmen as giving them an opportunity to examine samples of goods in which they are interested. Any obstacle to this direct contact between buyer and seller should be discouraged and the fullest liberty of trading allowed. The more progressive Bolivian leaders

recognize the defects of the present licensing system and the injustices which it causes to both importers and exporters, and they are in favor of a national license of reasonable amount, to take the place of the present locally assessed fees. "The system is cumbersome and prejudicial to the development of international commerce," said José Luis Tejada, former Minister of Finance.

Salesmen, like all other persons visiting Bolivia, are required to carry a passport, which is also useful for purposes of identification at the American consulate or legation. The consulate at La Paz is in possession of a large and up-to-date mass of information on trade conditions in the country, and a call there may be of considerable value to a salesman not familiar with local conditions. It is also of great advantage to the salesman to carry letters of introduction, not only from his principals, but also from banks or other high sources in his country. South Americans are much impressed by this kind of document and look on it as a guaranty of the salesman's reliability. Those who are well provided with such papers find it much easier to gain the confidence of the local business men. A power of attorney is necessary only where it is planned to enter into contracts, or where it is desired to obtain advance payments on orders.

Salesmen may obtain the necessary data on which to compute their scale of traveling expenses from the section of this work entitled "Travel Notes" (p. 256).

The following rules regulating the importation of samples into Bolivia are translated from the customs regulations of that country:

ARTICLE 192. Samples are all pieces of textiles and other such articles having no appreciable value. Samples are also manufactured articles which have a value but which are imported in small quantity and manifestly for the purpose of displaying the character of the articles.

ART. 193. Samples may be disembarked without any delay and at once after the presentation of the ship's manifest to the customs authorities by the captain of the vessel in which the samples are imported, prior to the submission of the itemized manifest of the ship's cargo. Cases containing samples, however, which have been listed in the itemized cargo manifest of the vessel may not be disembarked prior to the submission of the manifest and must submit to the usual requirements for other merchandise imported.

ART. 194. A special form of invoice is used in declaring samples for entry by the customs authorities. This form is to be made out in quadruplicate.

ART. 195. Customs inspectors will accept as samples only such merchandise as in their judgment can properly be classed as such. If merchandise presented as samples is not accepted as such by the inspector, this fact shall be noted on the declaration and the merchandise will be subject to the duties ordinarily collected on goods of the same class, provided the goods introduced as samples appear in the itemized manifest of the vessel by which they were imported. If not so listed, the goods introduced as samples shall be subject to a fine amounting to double the usual duty.

ART. 196. In the case of "samples without value," the declaration "Muestras sin valor" written on the invoice will be sufficient. If, however, the samples are dutiable, the invoice must show the mark, the number, and the contents of each package; but it need not contain a statement of the quantity of each sample, this latter information being supplied by the inspector who dispatches and appraises the samples.

ART. 197. If any package is declared to contain "muestras sin valor" and is later found to contain articles of value and dutiable, such article shall pay double the ordinary rate of duty.

ART. 198. When packages of merchandise containing dutiable goods are left for storage at the customhouse, samples from these may be removed only once. Permission for removing samples of this nature must be obtained by formal application to the collector of the customhouse in which the goods are stored.

ART. 199. The trunks of commercial travelers containing samples from which sales are to be made and which have been admitted under bond with the under-

standing that the same, together with all of their contents, shall be reexported, must be presented to the collector, prior to their reexportation, for the necessary inspection of their contents. In order to obtain the refund of the amount deposited or the cancellation of the bond, a landing certificate must be presented originating with the collector of the customhouse at the foreign port to which the goods have been transferred or with some Bolivian consular official in that country.

Thus, only samples without commercial value may be imported free of duty. The customs authorities usually mutilate the samples in such a manner as to render them unsalable, without destroying them. However, the owner should see to it that the customs inspectors do not render his samples unfit for display purposes, as has sometimes occurred, when samples have been so mutilated as to lose all value even as such. Samples in general may be imported without payment of duty under bond furnished by a bonded customs broker, which is canceled upon the reexportation of the samples, unless some of the samples are sold, in which case the amount of duty leviable on the samples sold is withheld. The reexportation of the samples need not be made through the same customhouse through which they were imported, and the bond is canceled upon the presentation of a certificate from the customhouse of reexportation. The samples are permitted to remain in the country for a period of 90 days, which may be extended for 30 days longer, after which time, if the samples have not been reexported, the duty is collected.

The clearance of trunks and sample cases requires from one to three days after their arrival, though it is sometimes possible to secure their release on the day of arrival. However, baggage arriving at a given destination after 4 o'clock will not be examined by the customs authorities until the following day. For checking his baggage from one point to another the traveler should appear at the station at least half an hour before the departure of the train, as the weighing of trunks and other formalities are carried out with great deliberation. This can generally be handled by a porter from the hotel where the salesman is staying. Particular care should be taken not to lose the "guia" or receipt for the baggage shipped.

COMMISSION HOUSES.

Much of the buying in Bolivia is done through commission houses. This is the rule with the smaller retailers, but is also the practice of the larger buyer. The latter often prefers it, in spite of the added cost of the goods which it entails, because it relieves him of the trouble connected with bringing the goods from the United States, and because he can order from the samples or catalogues which the commission houses always have, or even from the stock in their "bodegas" or warehouses. In the latter case he can replenish his stock on short notice instead of having to wait two or three months for the arrival of the goods from the exporter. From the exporter's or manufacturer's standpoint, the advantage of dealing with the foreign trade in this way lies in the commission firm's greater familiarity with local market conditions and the ability of its organization to cover the field more effectually than could be done from an office in the United States. However, in giving exclusive representation for a certain line to these houses it must be remembered that some of them are already overloaded with agencies. When one of these houses carries

a number of competitive brands in the same line, it is almost inevitable that it should push one of these brands to the disadvantage of the others. While some commission houses act as jobbers and sell on a commission basis, others sell on consignment.

TERRITORY TRIBUTARY TO PRINCIPAL CENTERS.

LA PAZ.

La Paz is the principal distributing center of Bolivia. Though it is far from the geographical center of the plateau country, its excellent connections with the coast give it a distinct advantage as an importing point, while the Bolivia Railway connects it with the other cities of the plateau, except with Sucre, which is not located on a railway. Its commercial sphere of influence does not, however, extend much below the line of the Rio Mulato-Potosi Railway. Nearly all the important importing houses have their head offices in La Paz. However, there are a few exceptions, such as Graham, Rowe & Co. in Oruro, several Cochabamba firms, and Urriolagoitia, of Sucre. The plateau area can be covered from La Paz better than from any other city, though it is the exclusive distributing point only for the surrounding Provinces of the Department of La Paz. Imports by Antofagasta are largely distributed from Uyuni, Potosi, Oruro, and other points. The La Paz firms send salesmen into the districts not directly covered by their branch houses, though merchants in the smaller places also make business trips to La Paz or other cities for the purpose of making their purchases.

ORURO.

Oruro is more nearly independent of La Paz than any other city of importance, though large quantities of goods are bought through the larger city. The territory more or less tributary to Oruro includes the Department of that name, part of the mining region in the adjoining part of the Department of La Paz, the very important mining districts in the northern part of the Department of Potosi, and the Department of Cochabamba.

Because of its position as the chief mining center of Bolivia, Oruro is a very important commercial city, ranking next to La Paz in this respect. The mining camps for a wide radius are supplied from Oruro, though La Paz competes with Oruro for this valuable trade. In fact, most of the important Oruro houses are branches of La Paz firms; there are, however, several exceptions to this rule. The tributary country is well covered by the agents of these houses. There is always a large demand for miners' tools and general hardware, explosives, sacks for "barrilla," and fuel and lubricating oils.

Local manufacture is now supplying much of the demand for miners' clothing. The Bolivian shoe factories are making a strong shoe for miners, which retails for about 14 bolivianos, and high-laced boots, which sell for 40 to 45 bolivianos. Leather clothing of good quality, well suited to wear in the mining camps, is also being produced, a full suit of such material being sold for about 100 bolivianos. There is always a good market for the "bayetas," or bright-colored coarse baizes worn by the "chola" class of women. Considerable quantities of canned goods are also sold in the mining centers.

Most of the mining machinery is sold through about half a dozen important houses, which watch this demand closely from their Oruro or La Paz offices.

Total imports through the Oruro customhouse for 1918 amounted to 8,625,200 bolivianos, or approximately one-fourth of the total imports of Bolivia. However, this does not include the large quantities of goods reshipped from La Paz into the Oruro district.

COCHABAMBA.

Though Cochabamba buys from both Oruro and La Paz, there is a growing tendency on the part of its merchants to buy directly from abroad. The market covered from Cochabamba includes all of the Department of that name. (except the corner nearest to Oruro), the upper Mamore basin of the Beni, and the western part of the Department of Santa Cruz.

Since the opening of the railway from Oruro in 1917 there has been a decided improvement in general business conditions in the Cochabamba district. Some local merchants declare that the volume of their business has doubled during this time. However, there is needed not only a greater development of the immediately tributary territory, but also the opening up of better connections with the country to the east and northeast—that is, with the regions of Santa Cruz and the Beni. There is little local capital for the development of industries, and whatever is given to the further development of the district must come largely from foreign money and initiative, the introduction of which the people of the region will welcome and facilitate. Because of the lack of extensive mineral deposits such as exist in the Departments of the plateau, the progress of this territory must depend not only on the expansion of Cochabamba's trade with other Departments, but also on agricultural development and the initiation of manufacturing, such as that of flour, whereby the agricultural products of the region can be utilized.

In the matter of its foreign trade, Cochabamba is becoming more and more independent of La Paz and Oruro and is disposed to deal directly with the exporter. Because of its inland position and the number of changes necessary on the way, it is advisable to have arrangements made with consignment agents in Arica or Antofagasta to forward goods destined for Cochabamba, though this matter is generally handled by the ultimate consignee. Imports for the district come in through both these ports, though in the case of merchandise from the United States there is an increasing tendency to favor Arica over the more southerly port.

The trade of the tributary towns is handled by agents sent out by the importing houses in Cochabamba. The most important of these towns are Quillacollo, Punata, Tarata, Cliza, Arani, Sacaba, Mizque, and Aiquile, which, with the exception of Mizque, have populations of 1,000 to 10,000 people. In addition to these towns, there are those on the way to Santa Cruz and the trading centers of the Beni.

Cochabamba is the chief center of German trading activity in Bolivia. Though their trade suffered during the war, the German houses there have maintained their organization and some of them are among the most efficient in Bolivia. They are now buying

through local American and British importing houses and reselling the goods in the interior and even in the immediate locality of Cochabamba: some are dealing directly with American exporters. Nearly all the business with Santa Cruz and the Beni country is in their hands.

POTOSI.

As Potosi lies in the contested zone of attraction of the Arica and Antofagasta routes, it buys from both directions. Houses in Antofagasta, as well as in Oruro and La Paz, cover this field, and there is a certain amount of direct buying from abroad.

Practically all of the goods sold in the Potosi district are bought indirectly through Oruro or La Paz, or through Antofagasta. However, although few houses import directly from abroad, there is an increasing tendency in this direction. Some important La Paz houses maintain agencies in Potosi for handling the trade of that region. The Jugo-Slavs control the grocery business, as in Oruro, and are entering the hardware business to an increasing extent. There are relatively few well-to-do families in the city, and very little high-class merchandise is seen in the local stores, which generally carry mixed lines of goods; many of these resemble the oriental bazaar in arrangement. Since the buying capacity of the majority is very small, this factor largely determines the conditions of the local mercantile business. Among the most important items of local trade are tocuyos, or sheetings, and cheap flannels for the Indians and cholos. Mine supplies, including dynamite, cement, lumber, lubricating and fuel oils, calcium carbide, etc., are naturally in great demand in the trade of the district.

The total value of the business of the country tributary to Potosi, except the Sucre territory, is not great. The region includes such towns as Puna, to the southeast, and Betanzos, to the east, and some merchandise is also sent to places as far away as Cotagaita and Camargo, though the latter towns are also supplied from other centers, such as Uyuni and Tarija.

SUCRE.

Sucre's commercial position is similar to that of Potosi, through which its external trade is forced to pass. However, Sucre is even more dependent on intermediary selling agencies than is Potosi, though some of the more important local houses buy directly from the United States and Europe.

Sucre is not at present a place of great commercial importance, in the degree to which, for example, Oruro is. The limited resources of the surrounding country do not permit any considerable expansion of the city's business, and any future development must largely come through the exploitation of the region to the east, particularly in the Provinces of Azero and Tomina, where the petroleum and other mineral fields of the Department are located. There is a relatively large amount of local capital for investment, but it is not in sufficient quantities for the conduct of large enterprises, and local financial interests would welcome the introduction of American capital and skill for the promotion of those undertakings for which their own means are inadequate.

Local business houses buy either directly from the United States or Europe, or through Potosi or La Paz houses. The latter is probably the more common method of making purchases. Goods brought in through Antofagasta, in addition to the transshipment from steamer to train at that port, have to be transhipped again at Uyuni to Potosi, where they are loaded on mules for Sucre. This makes direct shipments to Sucre merchants difficult, so that goods have to be forwarded through consignment agents to the point of destination. Representatives of La Paz houses, or the Potosi agents of La Paz houses, make periodical trips into Sucre for the purpose of handling the trade of that place. The trade of towns tributary to Sucre, such as Padilla and, to a certain extent, Colquechaca, are covered by agents sent out in turn from the Sucre houses. Some families buy directly from mail-order houses in New York, a few of them keeping funds on deposit at these New York firms, against which they order. This fact is especially true of women's wearing apparel. It is noticeable that Spanish editions of style books are good mediums for reaching this class of trade and can be followed up by catalogues in that language. Sucre stores are generally unpretentious, and at the time of the writer's visit in 1920 the market appeared decidedly understocked.

EL BENI.

The principal trading firms of the Beni region are identical with the leading rubber companies which have been enumerated above, including such houses as Suarez Hermanos, Zeller, Villinger & Co., Braillard & Co., Alfredo W. Barber & Co., etc. Among these firms those of German nationality have predominated in the trade of the region. Some Syrians and Greeks also work as itinerant merchants selling goods from place to place along the rivers.

The principal rubber exporters of this region are at the same time importers of merchandise, which they sell either from their houses in the principal towns or in the stores located about their rubber "barracas." Thus the 5,000 or more employees of a firm like Suarez Hermanos do their buying at the stores operated by this company. The principal distributing points are Riberalta, Villa Bella, Guayaramerin, Cobija, Trinidad, Magdalena, and Baures.

Previous to the war the larger part of the merchandise sold was of German origin, but during the war Brazilian goods in many lines gained a prominent place in this market, and imports from the United States also increased considerably. Brazil not only has the advantage of being nearer to the market than any trade rival, but Brazilian products enjoy preferential rates in many cases on the Madeira-Mamore Railway. The German houses which trade in the Beni have also been accustomed to carry on a triangular trade, by which they exchange manufactured goods in Cochabamba and Santa Cruz for products of those districts, such as flour and beer from Cochabamba and sugar, rice, coffee, alcohol, and lard from Santa Cruz. These goods are then sold in the Beni, where the houses obtain their rubber for export to Europe. The firm of Zeller, Villinger & Co. operates a large sugar mill near Santa Cruz and exports a part of the product to the Beni. However, the decline of this local trade, because of the opening of the Madeira-Mamore Railway and the falling off in the rubber business of the Beni, has been one of the most important

factors in causing the present stagnation in business in Santa Cruz. Profits on sales of merchandise in these regions are very high, generally ranging from 50 to 400 per cent. Much of the merchandise sold is put up with a view to external appearance rather than to real quality and durability. Unusual care must be used in packing goods destined for these markets, not only because of the rough handling that is inevitable, but because of the excessive humidity and the heavy rains of the wet season.

The principal lines sold in this country are hardware, including general tools and cutlery and the special equipment used by the rubber gatherers; dry goods, especially cottons, notions, and ready-made clothing; perfumery, toilet articles, and novelties; canned goods and flour; beers, wines, and liquors; drugs and patent medicines, including sulphate of quinine and aspirin. A market should be developed here for such lines as screen wire, water filters and coolers, launches and light canoes, and small ice-making machines.

A branch of the Banco de la Nación Boliviana was established at Riberalta in 1913 and has greatly aided in financing commercial transactions in this region. Previous to its foundation the loss on the purchase or sale of drafts on Manaos or Para generally amounted to from 5 to 10 per cent. There is a branch of the Bank of London & the River Plate at Manaos and a branch of the Mercantile Bank of the Americas at Para. Letters on La Paz and Cochabamba are accustomed to circulate for a long time as legal tender with the successive indorsements on the back. In the matter of exchange Bolivian currency is generally at a disadvantage as regards Brazilian money, especially in the towns along the border.

Prices have been very high in this region as a result of the high costs of transportation and the excessive profits made by the trading houses.

SANTA CRUZ.

As in the Beni, there is a condition of general depression and stagnation in business in the Santa Cruz country, and there can be little hope of any radical improvement until that region has better connections with the outside world. Only the building of railways from either direction can give it the prosperity to which its natural possibilities entitle it. Hitherto the market has been a small one and has been left almost exclusively to the Germans, who work the field not only from their local trading houses, but from Cochabamba, Puerto Suarez, Yacuiba, and the river towns of the lower Beni region. However, the entrance of the Madeira-Mamore Trading Co. into the field and recent large sales in Santa Cruz by a British house of Cochabamba should mark the end of the German monopoly in that market.

The principal goods in demand are cottons, canned goods, general hardware (such as axes, saws, and machetes), hats and general wearing apparel, usually of a cheap grade, prepared medicines, tin and galvanized wares, rifles, and light plows. There is also a need for small sugar-making apparatus, mills for husking rice, and light sawmill equipment. It should be remembered that all machinery sent into the Santa Cruz country must be transported from river or railhead to its destination by means of oxcarts, and that, moreover, such merchandise can not be transported over the Cochabamba route, which is used only by mules.

UYUNI.

The importance of Uyuni, which is the commercial center of southern Bolivia, is due to two factors. First of these is its position as a railway junction. At this point all freight and passengers must be transhipped between the lines, with different gauge, of the Antofagasta & Bolivia Railway and the Bolivia Railway Co.

The second factor in the commercial importance of Uyuni is the existence of several important mines in the vicinity, including those of the Compañía Huanchaca de Bolivia, the Áramayo Francke Mines (Ltd.), and the Compañía Minera y Agrícola Oploca de Bolivia. These companies maintain agencies in Uyuni, through which they purchase most of their supplies and which have charge of the transshipment of their ores for Antofagasta.

Uyuni is commercially tributary to Antofagasta, practically all of the exports of the district being sent out through that port and its imports coming in by the same route. The territory is covered by the agents of Antofagasta houses, some of which have branches in Uyuni. As some lines of American goods are inadequately represented in Antofagasta, a like condition prevails in Uyuni. The American goods most commonly seen in Uyuni stores are canned goods, toilet articles, and certain lines of hardware, such as shovels, axes, saws, and knives of all kinds. The mines buy large quantities of such goods as lumber, cement, oils, galvanized iron, dynamite, petroleum, and tools and machinery. The most of such goods sold in this district are of American origin. In general lines of merchandise for the consumption of the local population there is little demand for high-class goods. The stores themselves are generally quite small and of mediocre appearance.

TARIJA.

Tarija, a city of 9,000 people, is situated in an isolated position in the south-central part of the Republic and close to the Argentine frontier. The latter circumstance determines the commercial position of Tarija, making it tributary to the Argentine railhead at Embarcacion on the Bermejo. Other roads lead over the mountains to Tupiza and La Quiaca, where they connect with the main north-and-south trade route between Uyuni and Jujuy, and east to connect with the Embarcacion-Yacuiba-Santa Cruz road. Tarija's tributary country is relatively small, being restricted to the neighboring Provinces of the Department of the same name and part of the Province of Cinti, which lies in the southern part of the Department of Chuquisaca.

TRADE-MARKS.

Bolivia has ratified the scheme for a proposed international registration of trade-marks, with a central office at Rio de Janeiro. However, pending ratification by some other South American countries, this project has not yet been put into force. Meanwhile the registration of trade-marks is governed by the law of January 15, 1918, which was put into effect three months after that date. Trade-marks are granted by the Government for a period of 10 years, and renewals may be had for additional periods of 10 years, but they must be requested three months before the current term expires. Marks

already registered at the time the law went into force continue to be protected for 10 years from the date of registration upon the payment of the annual fees prescribed by the former law, and where the annual fees have been paid in advance for a longer period the registration will continue in force throughout the time for which taxes have been paid, but no new payments of taxes for the purpose of extending the duration will be accepted.

The law resembles those of most other Latin American countries in recognizing priority of registration as the basis of ownership. Provision is made, however, for opposing the application for or securing the cancellation of the registration of marks consisting of names of persons or business firms. Where any trade-mark is opposed, objection must be presented within 50 days after the first published notice appears in the *Boletín Departamental*. Claim for cancellation may be presented within 18 months after the appearance of such notice. After the lapse of that period the ownership of the trade-mark can not be contested. Priority of use is taken into consideration in some cases, as the law states that "where priority in the use of the mark is involved, only absolute proof will be accepted." Commercial names, including the names of corporations, are entitled to protection without the necessity of registration. In order to secure additional protection such names may be entered in a special register directed to be kept for that purpose.

Only in the case of marks for chemical and pharmaceutical products is registration compulsory. According to article 7 of the law, "the registration of marks for chemical and pharmaceutical products shall be obligatory. In the case of medicinal specifics (patent medicines), the formula of the component substances shall be set forth on the container or on the conjointly affixed label."

Application for the registration of a trade-mark must be directed to the "Jefe de la Oficina de Propiedad Industrial, Ministerio de Industria." With the application there must be transmitted six facsimiles of the mark, an electrotype not exceeding 10 centimeters long by 8 centimeters wide by 24 millimeters thick (3.9 by 3.15 by 0.94 inches); two copies of description, in Spanish, indicating the products with which it is to be used and stating the number of the class, in conformity with the legal nomenclature (art. 37 of law of 1918). A copy of this law is on file in the Division of Foreign Tariffs, Bureau of Foreign and Domestic Commerce, Washington. A power of attorney must be legalized by a Bolivian consular official in the United States.

For each trade-mark covering a single class of merchandise there is a fixed charge of 30 bolivianos, plus 5 bolivianos for each additional class covered. Collective trade-marks, and those covering more than six classes of merchandise, pay 60 bolivianos. The special forms used for registry or renewal cost 5 bolivianos. Certificates of transfer cost 10 bolivianos. Legalized copies of previous certificates are made on stamped paper costing 1 boliviano. For each publication of the cut of a trade-mark, with description, 2 bolivianos is charged. The description is published three times, at intervals of 10 days. The publication of a commercial or industrial name, design, etc., costs 1 boliviano for each insertion.

SHIPPING DIRECTIONS.

PACKING.

Packing of goods destined for Bolivia should be determined by the hard usage which is almost inevitable in transit and by the rough conditions of internal transportation. Freight is subjected to extremely severe handling at the Pacific ports, where goods for Bolivia are disembarked. Merchandise is landed in lighters, and boxes may be dropped over the side of the ship into the lighter in a heavy sea—if they do not miss the lighter altogether. From the lighters freight is lifted by cranes onto a wharf and later loaded into cars for La Paz. Goods entering Bolivia via Mollendo must be transferred again at Puno and Guaqui on Lake Titicaca, and freight routed by Antofagasta is transferred at Uyuni. Only goods sent through Arica reach La Paz without change. Before reaching its ultimate destination in the interior of Bolivia merchandise will have been reshipped from La Paz or some other point having a customhouse, and will perhaps have been carried a long distance by mule train. Not only is merchandise that is carried by pack train liable to be damaged by rain between November and May, but on the narrow mountain trails the pack may be knocked off or damaged by a rock overhanging the trail or by a caravan passing in the opposite direction. Goods that will certainly or probably be sent some distance from a railway should be packed accordingly. In order to prevent breaking up the original packages, goods should be packed, if practicable, in boxes or waterproof bales of not more than 100 pounds each and not over 18 inches in thickness. As losses from pilfering are common on the way to Bolivia, packages should be made as secure as possible. In packing some classes of goods it is necessary to bear in mind that goods must pass through the Tropics on their way to Bolivia, and that, moreover, the climate of the lowland country of eastern Bolivia is very hot.

There is a great difference between the different kinds of American packing that one finds in a Bolivian customhouse. There are cases of goods that are as well packed as any that come from Europe, and others that have been very carelessly put up. Certain American firms have a reputation in Bolivia for always packing well, and others are as well known by their bad packing. The director of the La Paz customhouse declared to the writer that with few exceptions American goods are as well packed as those of any other nation. But it is the widely advertised exceptions that damage the reputation of American trade in general in Bolivia.

As all exports to Bolivia pass through a foreign port of entry, goods should be carefully marked to insure their arrival. West coast shipments should be marked, preferably with stencil, as follows:

(Mark of consignee.)

Via Mollendo (or Arica or Antofagasta).

En transit La Paz, Bolivia.

Goods shipped to the Beni regions by the Amazon route should be marked as follows:

(Mark of consignee.)

Via Para.

En transit Riberalta (or other point), Bolivia.

Freight for Puerto Suarez should be marked as follows:

(Mark of consignee.)
Via Buenos Aires (or Montevideo) and Corumba.
En transito Puerto Suarez, Bolivia.

For Tarija the marks should read as follows:

(Mark of consignee.)
Via Buenos Aires and La Quiaca.
En transito Tarija, Bolivia.

ROUTING.

Freight for La Paz is generally routed by Mollendo or Arica, and for Oruro either by these ports or by Antofagasta. The most practicable route for shipments to Potosi and Sucre is through Antofagasta. This also applies to Cochabamba, and is also the rule for shipments to Santa Cruz; however, the consignee usually designates the port through which his order is to be sent, as he is more familiar with current conditions at the different ports, with the comparative freight rates to the plateau, and with facilities for forwarding freight to Bolivia. The usual routes followed by freight to different points in Bolivia are as shown in the following chart:

Points of transshipment.		TO LA PAZ.
Route A:		Routing from points of transshipment.
Mollendo.....	Southern Railway of Peru.	
Puno.....	Lake Titicaca steamer.	
Guaqui.....	Guaqui-La Paz Railway.	
Route B: Arica.....	Arica-La Paz Railway.	
		TO URUO.
Route A: Mollendo.....	As above to Viacha, thence by Bolivia Railway.	
Route B: Arica.....	As above to Viacha, thence by Bolivia Railway.	
Route C:		
Antofagasta.....	Antofagasta & Bolivia Railway.	
Uyuni.....	Bolivia Railway.	
		TO POTOSI.
Antofagasta.....	Antofagasta & Bolivia Railway.	
Uyuni.....	Bolivia Railway, via Rio Mulato.	
		TO SUCRE.
Antofagasta.....	Antofagasta & Bolivia Railway.	
Uyuni.....	Bolivia Railway, via Rio Mulato.	
Potosi.....	Mule train or cart.	
		TO TARIJA.
Route A:		
Antofagasta.....	Antofagasta & Bolivia Railway.	
Uyuni.....	Bolivia Railway.	
Atocha.....	Mule train.	
Route B:		
Buenos Aires.....	Central Argentine Railway.	
Tucuman.....	Central Norte Railway.	
Embarcacion.....	Mule train.	
		TO RIBERAITA.
Para.....	Amazon River steamer.	
Porto Velho.....	Madeira-Mamore Railway.	
Guayaramerin.....	Oxcart or mule train.	

TO SANTA CRUZ.

Route A:

Para.....	Amazon River steamer.
Porto Velho.....	Madeira-Mamore Railway.
Guayaramerin.....	Mamore River steamer.
Puerto Velarde or Cuatro Ojos.....	Oxcart or mule train.

Route B:

Mollendo or Arica.....	As above to Cochabamba.
Cochabamba.....	Mule train.

Route C:

Buenos Aires.....	Central Argentine Railway.
Tucuman.....	Central Norte Railway.
Embarcacion.....	Mule train.

Route D:

Buenos Aires.....	Parana River steamer.
Corumba.....	Barge and launch.
Puerto Suarez.....	Mule train or oxcart.

TO TRINIDAD.

Route A:

Para.....	Amazon River steamer.
Porto Velho.....	Madeira-Mamore Railway.
Guayaramerin.....	Mamore River steamer.
Puerto Ballivian.....	Oxcart.

Route B:

Arica or Mollendo.....	As above to Cochabamba.
Cochabamba.....	Mule train.
Todos Santos.....	Launch.
Puerto Ballivian.....	Oxcart.

Directions such as "Handle with care" and "This side up" should be given in Spanish or, preferably, in both Spanish and English.

In connection with the Arica route, it seems pertinent to present the following statistics, showing the movement of Bolivian commerce through that port; the figures were furnished by the Bolivian consulate and customs agency at Arica and were transmitted by American consul Homer Brett:

TOTAL BOLIVIAN TRADE VIA ARICA IN 1919 AND 1920.

Class.	1919		1920	
	Metrie tons.	Chilean pesos. ¹	Metrie tons.	Chilean pesos. ¹
Imports.....	33,547	19,287,622	45,558	29,940,881
Exports.....	32,627	31,543,083	42,174	52,166,881
Total.....	66,174	50,830,705	87,732	82,107,762

¹ The Chilean gold peso is equivalent to about 36.5 cents.

BOLIVIAN IMPORTS VIA ARICA IN 1920, BY COUNTRIES.

Countries of origin.	Kilos.	Chilean pesos.	Countries of origin.	Kilos.	Chilean pesos.
Argentina.....	30,056	64,762	Japan.....	114,305	74,789
Belgium.....	181,655	325,329	Netherlands.....	77,977	133,717
Canada.....	16,008	13,359	Norway.....	137,042	244,571
Chile.....	16,737,508	9,649,527	Panama.....	376	1,140
China.....	335,485	214,877	Peru.....	1,792,652	1,025,276
Denmark.....	1,600	7,124	Portugal.....	5,828	34,988
Ecuador.....	1,640	7,840	San Salvador.....	4,091	47,222
France.....	256,520	720,523	Spain.....	226,659	470,386
Germany.....	414,065	1,405,259	Sweden.....	261,901	324,607
Great Britain.....	5,172,730	5,260,727	United States.....	19,522,710	9,526,788
India.....	168,369	125,272	Uruguay.....	48,813	33,288
Italy.....	50,820	236,492			

BOLIVIAN EXPORTS VIA ARICA IN 1920, BY ARTICLES AND COUNTRIES.

Articles and countries of destination.	Kilos.	Chilean pesos.	Articles and countries of destination.	Kilos.	Chilean pesos.
Copper.....	24,643,079	5,271,142	Wolfram.....	227,184	391,317
United States.....	22,824,079	4,307,997	United States.....	132,664	213,115
Great Britain.....	1,794,022	947,696	France.....	29,871	39,988
Italy.....	24,978	15,419	Great Britain.....	8,911	13,511
Silver.....	228,724	1,310,832	Germany.....	55,735	124,703
United States.....	217,393	1,257,127	Other articles.....	451,433	854,058
Great Britain.....	11,331	53,705	United States.....	235,769	530,837
Tin.....	16,621,056	44,339,532	Great Britain.....	133,379	280,812
United States.....	12,671,762	35,491,314	France.....	23,659	13,749
Great Britain.....	3,874,454	8,725,490	Germany.....	4,724	5,980
Germany.....	74,840	119,728	Peru.....	54,899	13,729
			Total.....	42,174,476	52,166,881

SHIPPING DOCUMENTS.

Because Bolivia has no seacoast, through bills of lading are not issued to that country. Goods reach Bolivia by way of ports that are either Peruvian, Chilean, Argentine, or Brazilian. They are billed and consigned to the foreign port of transshipment, whence they are forwarded to the ultimate consignee in Bolivia. This necessitates marking the goods in such a manner that the transit character of the shipment may be evident. For this reason, as has already been indicated, all packages should be stenciled with the words in Spanish: "En transito para Bolivia." Otherwise import duties may have to be paid at both the port and the Bolivian customhouse. The importer generally designates in his order the port at which the merchandise is to be disembarked and the forwarding agent who is to have charge of transshipment at the port. Among the more important "despachantes de aduana" or forwarding agents at the west-coast ports are the following:

MOLLEND0.

Mollendo Agencies (Ltd.) (W. R. Grace & Co.).
 Golding & Co.
 Donnelly & Co.
 Cazorla Hermanos.

ARICA.

Arica Agencies (Ltd.) (W. R. Grace & Co.).
 Tomas Bradley.
 Lionel Barber & Co.
 Oscar M. Barrios.
 R. Valenzuela & Cía.
 C. G. Barahona.

ANTOFAGASTA.

W. R. Grace & Co. (Nitrate Agencies, Ltd.).
 Oscar M. Barrios.
 Barnett & Co.

CONSULAR INVOICES.

According to presidential decree of June 18, 1918, five copies of consular invoices are required for shipment to Bolivia. The shipper receives one copy of each set of invoices. One is sent to the customhouse of entry, one to the National Bureau of Customs, one to the

National Treasury, and the fifth is retained in the files of the consulate. Additional copies may be obtained from the consulate.

Consular invoices must be written in Spanish and must be accompanied by the bills of lading, commercial invoices, and any other documents necessary to prove the actual market value of the merchandise declared. It is required to give the following data in the consular invoice: Name of the consignee at the place of transshipment, name of the ultimate consignee in Bolivia, and the net and gross weight in kilos. The form of the Bolivian consular invoice is as follows:

FACTURA CONSULAR PARA BOLIVIA.

Consular invoice for Bolivia.

Ejemplar No. —. No. de Factura, —.

Copy No. No. of invoice.

No. de Orden, —.

No. of order.

Destinada a la Aduana de — por las mercaderías que se expresan, embarcadas
Destination customhouse of for merchandise described, shipped

por —, del puerto de —, el — de — de 19—, en el vapor —, Capitán
by from the port of the of 19 by steamer Captain

— a la consignación de —, de —, de orden, por cuenta
to the consignment of of to order, and for account

y riesgo de — de —
and risk of of

Marcas. Marks.	Números. Numbers.	Bultos. Packages.		Clasificación de la mercadería. Classification of merchandise.	Peso en kilos. Weight in kilos.		Valor parcial de la mercadería y total de la factura. Partial value of the merchandise and total amount of the invoice.	Derechos percibidos por el consulado al 2% sobre factura. Fees charged by the consulate at the rate of 2% on the invoice.
		Cantidad. Quantity.	Clase. Kind.		Bruto. Gross.	Neto. Net.		

If the price declared in the consular invoice is evidently less than the true value of the merchandise, the Government may confiscate the said merchandise, paying for it at the declared value and selling it at auction. (Par. 3, art. 16, law of Dec. 31, 1905.)

The shipper must make the following declaration on the invoice in Spanish:

Declaro (declaramos) ser verdadero el valor mencionado en esta factura.

I declare (we declare) that the value named in this invoice is the actual one.

If there is no customhouse at the place to which the goods are consigned, the consular invoice must designate the customhouse destination. Thus, goods destined for Cochabamba pass through the customhouse at Oruro, those for Tarija through Villazon, and those for Potosi through either Oruro or Uyuni, depending on the

port of transshipment. Bolivia is divided into the following customs districts:

Northern.....	La Paz.
Central.....	Oruro.
Southwestern.....	Uyuni.
Southern.....	Villazon (La Quiaca).
Southeastern.....	Yacuiha.
Eastern.....	Puerto Suarez.
Northeastern.....	Villa Bella, Cobija, and Manoa (Abuna).

In addition to these and subordinate to their authority are a number of "resguardos de aduana" located at minor points, where there is a certain amount of traffic across the frontier.

There are Bolivian consulates in the United States at New York, Baltimore, Boston, Chicago, Kansas City (Mo.), Mobile, New Orleans, Norfolk (Va.), Philadelphia, San Diego, San Francisco, and Seattle. Communications with any of these offices should be addressed to the "Consulate of Bolivia."

Consular fees are levied according to the following scale:

Certification of set of consular invoices:

Less than \$200 in value.....	\$3.
\$200 or more in value.....	2 per cent.
Extra copies of consular invoices.....	\$1.

Certification of bills of lading..... No charge.

Consular invoice blanks (must be purchased at consulate):

Set of four.....	9d. or equivalent.
No charge is made for the fifth copy.	

If an error in a consular invoice is discovered by the shipper, a letter of correction, written in Spanish, may be handed to the consul, who will certify one for each copy of the invoice, at a charge of 50 cents each. These letters of correction must reach the Bolivian customs authorities before the goods can be released to the consignee.

During May, 1920, an official decree provided that the charge of 2 per cent of the value of the goods for the certification of the Bolivian consular invoice should be based upon the manufacturer's value or bill of sale. The method as established by the original law was that the charges for certification of consular invoices were to be based upon the value of the goods plus the freight charges to the Bolivian customhouse of entry. The change resulted from a protest made by some British commercial interests on the ground that it was impracticable at the time of having the invoice certified to ascertain the exact amount of freight charges on goods to the Bolivian customhouse of entry. The new method of computing these charges proves simpler and more equitable and also reduces the amount to be paid for the consular certification of shipments to Bolivia.

FINANCING OF TRADE.

PRICE QUOTATIONS.

Price quotations to the Bolivian trade should be made c. i. f. port of discharge and should be in dollars. Price lists should be so prepared that there can be no uncertainty in the buyer's mind as to just what he will be required to pay for any given article. Habitual customers should be notified promptly of any general changes in

prices, as neglect of this precaution has caused considerable hard feeling among native houses. Some importers prefer discount to net prices.

CREDIT TERMS.

Though there is no strict uniformity in the matter, the customary credit terms prevailing in the Bolivian import trade are 90 days' sight or 150 days' date draft, documents against acceptance. However, cash payments have become more common, while in some cases, on the other hand, more than the above limit is allowed. Yet the peculiar conditions of Bolivian business make the general adoption of cash payments out of the question, while it is also highly doubtful whether credit terms will ever reach again the extremes attained before the war. During that period extravagantly long terms were offered by some European houses to their customers, amounting sometimes to a year or more and having a demoralizing influence on business practices in general. On the other hand, it is still common to hear American exporters charged with illiberality in the question of credits, when they refuse to grant the 90 days, which is generally accepted as a reasonable maximum for settlement. Comparatively few Bolivian buyers will agree with good grace to send cash with orders, though some local importing houses with considerable accumulated resources have shown a willingness to buy on this basis. The circumstances that should determine the granting of credit, beyond the factor of the particular importer's solvency and reliability, are the long time required for the transportation of merchandise from the port of shipment to the port of disembarkation, the delay at point of transshipment (often amounting to one to two months), and the long time required for turnover by importing houses with more than a strictly local business. Thus a La Paz firm may have to carry its customers in other parts of the country for two to six months. In addition to this there is the time lost in the distribution of such goods by rail or mule-train. In view of these conditions the three months commonly expected by Bolivian importers can scarcely be considered excessive.

Information as to the credit standing of Bolivian firms can usually be obtained from the leading banks of the country, who have shown themselves very willing to aid exporters in this way. However, it must be taken into consideration that a bank is somewhat predisposed to give a favorable report on its own clients and to be, at most, noncommittal on those of rival banks. However, it must be said in justice to the Bolivian banks that few cases are known where this motive has influenced a bank's report on the reliability of a business firm. Though they still cover the country inadequately through local representatives, the credit-information services of the well-known American organizations are being rapidly extended in Bolivia in scope and accuracy. With the existing sources of data at their command, exporters should have a satisfactory basis on which to determine the terms of payment in their Bolivian trade. Cases where shippers so informed have lost in dealings with Bolivian houses are rare.

A few Bolivian firms maintain open accounts in New York banks against which they order.

The extent to which Bolivian import trade is financed through different countries is illustrated by the following totals of drafts sold by the Banco de la Nación in La Paz between August 1 and November 23, 1918:

	Bolivianos.		Bolivianos.
London.....	4, 642, 486	Paris.....	169, 593
New York.....	1, 024, 652	Spain.....	120, 809
Argentina.....	1, 400, 562	Italy.....	104, 693
Chile.....	553, 779		
Peru.....	358, 471		8, 375, 044

Since 1918 there has been a considerable increase in the financing of buying operations through New York.

DELIVERIES AND COLLECTIONS.

The common procedure in making collections in Bolivia, as generally throughout South America, is as follows: The exporter draws to the order of his banker, and against the buyer, a draft to cover the value of the merchandise, and in addition all charges, such as freight, insurance, consular fees, interest, and banking charges, which have been paid by the shipper. This draft, drawn at the time the merchandise is shipped, is forwarded to the banker, together with the documents, including the commercial invoice, the consular invoice, the bill of lading, and insurance certificate. When the drawee accepts the draft the banker delivers the documents to him. Upon liquidation or payment, the banker remits to the shipper his check on New York for the value of the draft less the collection charges.

Should the shipper desire to receive the remittance at once, and without awaiting the maturity of the draft at 90 days' sight or 150 days' date, Bolivian banks will usually discount such bills immediately upon their receipt, provided both drawer and drawee are known to them as reputable concerns. In this case the collecting bank will remit the full value of the draft, less discount and collection charges, which should have been included in the invoice and covered by the draft. The charge usually made for discounting foreign bills on Bolivian buyers is $\frac{1}{4}$ per cent commission and 6 per cent discount. Remittances are made at the bank rate of exchange of the day plus cable charges. For collections in La Paz the commission charge is $\frac{1}{2}$ per cent for clean or documentary drafts of a value less than \$1,000, and $\frac{1}{4}$ per cent for larger items, with a minimum charge of \$0.50. In addition there is a charge of 1.50 Bolivianos for postage, etc. The rate for collections in the smaller cities of Bolivia varies according to their remoteness from La Paz, being 2 per cent in Santa Cruz and reaching even 5 per cent in Riberalta.

All drafts for collection should include these charges in their face value. The banks do not usually make any extra charges of any kind. The collection charges are the same for clean and for documentary items, whether for sight or for long usance. In forwarding items instructions should be given as to whether or not they should be protested, as the law provides a time limit within which protest must be filed and there might be no time for seeking instructions. The bank may protest an uncollected draft, either for non-acceptance

or nonpayment, without previous instructions from the drawer to that effect. The usual charge for protest is about 11 bolivianos for each item in La Paz, but the rate varies in other cities. It has also been common for banks handling collections for European shippers to assume the responsibility in the matter of granting renewals. These extensions of time on drafts are of course only granted where, in the bank's judgment, the circumstances of the case fully warrant such a concession. If the item is paid after protest, the drawee pays the protest charge. As regards protest of items, the drawee has 24 hours of grace—that is, until 3 p. m. of the following day, the closing hour of the banks.

It is at least theoretically impossible to obtain a consignment of goods before the arrival of the related documents—that is, the commercial and consular invoices. However, in practice this requirement is sometimes waived, as in cases where the bank agrees to guarantee the submission of the documents and the payment of the import duties and charges. Goods thus imported without a corresponding consular invoice are fined to the extent of 4 per cent of their value.

A copy of the manifest covering the goods disembarked at the coast must be submitted with the other documents. This is forwarded to the customhouse of entry in Bolivia by the Bolivian "agente aduanero" or customs representative at the port where the merchandise is landed.

The clearance of goods through the Bolivian customs is handled by regularly licensed "agentes de aduana" or customs agents, who must be entrusted with all the necessary clearance papers before they can effect the release of merchandise. These agents are employed by the consignee. Among customs agents in Bolivian cities are the following:

LA PAZ.

W. R. Grace & Co.
V. Jauregui & Cía.
Tomas Bradley.
Cazorla Hermanos.
Federico Bernaldes.

ORURO.

W. R. Grace & Co. (Compañía Despachadora de Aduana).
V. Jauregui & Cía.
Oscar M. Barrios.
R. Valenzuela & Cía.
Dauelsberg & Cía.
Jorge Larrieu.

UYUNI.

Oscar M. Barrios.
Dauelsberg & Cía.

Goods must be entered at the customhouse within 48 hours after arrival. The fine imposed for failure to make such entry within the required time limit is 0.05 boliviano per day for each 23 kilos or fraction thereof. The monthly charge is 30 bolivianos. In case of inflammable goods, this charge is doubled. This fine is paid by the consignee. Goods may be left in the Government warehouses for 30 days, at the end of which time they are auctioned for the payment of the import duties and accumulated warehousing. How-

ever, it is possible to extend this period to a year by petitioning the customs authorities. The Government storage charges are 0.15 boliviano per 100 kilos, payable at time of removal of goods. In case of necessity the local banks arrange for the storing of goods, if requested to do so by the seller. The insurance premium on ordinary goods in storage is 1 per cent, as against $\frac{3}{4}$ per cent in inflammable goods. It is usual for the consignee to pay these storage and insurance charges, unless the bank is otherwise instructed. The local banks in Bolivia do not accept the consignment of goods. However, parcels may be sent to a bank for delivery to consignee against payment or acceptance of draft.

IMPORT TARIFF.

The new Bolivian import schedules, which went into effect on May 1, 1920, are contained in the publication entitled "Arancel Aduanero de Importaciones." This book can be obtained for the sum of 10 bolivianos from any of the leading book stores in La Paz, such as those of Gonzalez & Medina and Arno Hermanos. An additional boliviano should be inclosed to cover mailing charges. Copies are also available for consultation in the files of the Bureau of Foreign and Domestic Commerce at Washington. The most radical change made by the new tariff law is the substitution of a specific for an ad valorem basis in nearly all classes. The number of classes was also reduced by about 50 per cent. However, customs procedure has changed little from that described in Tariff Series No. 34, "Tariff Systems of South American Countries," published by the Bureau of Foreign and Domestic Commerce.

STATISTICS OF FOREIGN TRADE.

The official statistics of the foreign trade of Bolivia are found in the publication entitled "Comercio Especial de Bolivia," which is prepared by the Section of Commercial Statistics of the General Bureau of Customs. However, this annual does not usually appear until at least 10 or 11 months after the end of the year which it covers, and at the time this handbook was completed—February, 1921—the latest detailed figures available were for 1918, save in the case of some larger totals. The publication referred to can be obtained from either of the more important La Paz book stores at a cost of 10 bolivianos, in addition to which about 2 bolivianos should be sent to cover carriage of the bulky volume. Copies are also held for reference in the Bureau of Foreign and Domestic Commerce at Washington.

Values in the official statistics are only approximations to accuracy, since they represent the figures on which import duties are assessed and not the commercial values. However, as a basis for calculating the total foreign trade of Bolivia they are much more dependable than the statistics of foreign countries, which do not take into account the fact that much of the merchandise sent to Mollendo, Arica, and Antofagasta, presumably for consumption in Peru and Chile, is in fact destined for Bolivia, and that a large part of the exports from these ports consist of goods in transit from Bolivia. In the Bolivian

statistics themselves it is impossible to distinguish in all cases between strictly transit and reexport shipments through the neighboring countries. Thus a large amount of American lumber purchased by an Antofagasta house and later shipped into Bolivia is credited to Chile in the Bolivian statistics, whereas its true source of origin was the United States.

TOTAL FOREIGN TRADE FOR PERIOD 1909-1919.

The value of the total imports and exports of Bolivia by years for the period 1909-1919 was as follows:

Years.	Imports.	Exports.	Total.
	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>
1909.....	36,939,940	63,764,466	100,704,407
1910.....	48,802,394	75,622,146	124,424,541
1911.....	58,371,409	82,631,171	141,002,580
1912.....	49,508,989	90,122,987	139,631,977
1913.....	54,762,833	93,721,513	148,484,347
1914.....	39,761,222	65,801,146	105,562,368
1915.....	22,574,566	95,210,350	117,784,917
1916.....	31,098,215	101,484,800	132,583,015
1917.....	33,480,831	157,748,054	191,228,885
1918.....	34,999,886	182,612,850	217,612,737
1919.....	61,997,024	144,251,527	206,248,552

EXPORTS BY CLASSES OF GOODS.

Total exports from Bolivia by different classes during the years 1913-1917 were as follows:

Classes.	1913	1914	1915	1916	1917
	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>
Live animals.....	117,310	238,869	792,860	1,811,492	1,751,983
Foodstuffs.....	27,759	75,034	140,800	94,730	71,084
Hides.....	359,790	286,665	470,852	620,166	716,763
Coca leaves.....	682,192	651,423	731,902	623,880	688,841
Quinine bark.....	41,183	26,538	78,561	158,488	196,742
Rubber.....	14,651,647	8,280,370	10,768,937	13,292,264	15,424,202
Lumber.....	3,700		12,501	25,625	17,600
Copper ores.....	3,286,714	4,442,735	14,035,310	8,854,524	11,921,144
Lead ores.....	353,059	155,457	353,239	460,949	1,514,914
Zinc ores.....	233,150	140,623	18,559	236,609	530,780
Tin ores.....	67,784,377	42,479,837	44,885,450	42,652,258	85,258,482
Bismuth.....	2,092,924	2,802,278	3,670,452	3,154,905	4,116,677
Wolframite.....	415,417	428,300	1,497,845	5,675,700	10,810,291
Antimony.....	12,410	30,616	13,412,286	16,996,503	17,017,907
Wools.....	32,689	100,223	214,166	300,212	409,387
Manufactured articles.....	261,199	286,604	295,842	1,661,773	1,169,257
Silver ores.....	2,784,354	2,531,328	2,982,858	4,493,610	5,693,639
Coined gold.....	153,750	2,478,662	57,331	23,500	1,250
Coined silver.....	212,431	20,807	397,754	94,022	328,273
All other articles.....	215,458	344,777	362,845	253,590	108,838
Total.....	93,721,513	65,801,146	95,210,350	101,484,800	157,748,054

Classified in greater detail, the exports from Bolivia in 1918, including reexported goods, amounted to the following figures (the products are shown in the order of their value):

Articles.	Kilos.	Bolivianos.	Percent- age of total value.
Tin concentrates.....	48,052,400	126,950,616	69.51
Wolfram.....	3,418,316	10,591,429	5.79
Rubber, fine.....	2,860,509	8,272,578	4.53
Copper ores.....	19,896,837	4,155,799	2.28
Antimony.....	6,822,725	4,141,400	2.26
Silver sulphides.....	120,965	3,453,517	1.83
Silver ores.....	12,637,341	3,196,140	1.75
Bismuth bars.....	248,982	3,144,371	1.71
Copper concentrates.....	3,935,295	2,955,327	1.61
Rubber, ordinary.....	1,427,004	2,765,461	1.51
Tin bars.....	748,627	2,660,522	1.45
Lead ores.....	4,589,432	1,795,207	.98
Live animals.....	6,875,179	1,556,029	.85
Sheep wool.....	725,577	1,139,102	.62
Silver cement.....	156,902	938,941	.51
Coca leaves.....	355,151	771,564	.42
Bismuth concentrates.....	75,569	616,901	.33
Salted hides.....	736,856	510,861	.27
Copper sulphides.....	1,900,000	429,913	.23
Bismuth ores.....	111,523	415,220	.22
Alpaca wool.....	191,806	341,975	.18
Bismuth residues.....	53,998	258,686	.14
Iron manufactures.....	1,481,799	225,126	.12
Silver coin.....	4,897	208,322	.11
Llama wool.....	146,571	198,513	.10
Rails.....	1,226,735	174,630	.09
Quinine bark.....	190,528	168,919	.09
Copper cement.....	134,882	104,682	.05
Copper matte.....	133,350	100,600	.05
Manufactured furs.....	2,783	57,531	.03
Automobiles and accessories.....	15,848	40,160	.02
Eggs.....	42,947	37,558	.02
Household utensils.....	11,826	28,660	.01
Chuno.....	29,778	19,424	.01
Cotton thread.....	3,011	17,002	.01
Other manufactured goods.....	42,661	17,895	.....
Mining machinery.....	128,421	16,433	.....
Wire.....	5,841	15,450	.....
Glassware.....	3,397	14,194	.....
Antimony bars.....	13,343	13,922	.....
Coffee.....	13,050	11,547	.....
Firewood.....	712,000	11,000	.....
Sacks for metals.....	21,804	10,584	.....
Bank notes.....	5	10,000	.....
Locomotives.....	31,125	10,000	.....
Dried fruits.....	24,445	8,319	.....
Lead bars.....	17,419	7,833	.....
Jewelry.....	206	7,046	.....
Corn flour.....	16,828	7,040	.....
"Muko".....	15,250	6,415	.....
Machinery and parts, not elsewhere specified.....	26,800	5,726	.....
Cooking oils.....	3,218	5,572	.....
Fresh fruits.....	39,064	1,957	.....
Chemicals.....	327	4,585	.....
Fresh vegetables.....	12,523	4,075	.....
Other mineral oils.....	4,310	4,029	.....
Cacao.....	1,889	3,683	.....
Dry goods.....	903	3,650	.....
Wheat flour.....	6,900	3,000	.....
Iron tubing.....	4,450	3,000	.....
Carpenters' tools.....	1,884	2,004	.....
Other materials.....	11,296	2,815	.....
Metallic silver.....	309	2,822	.....
Zinc.....	4,186	2,680	.....
Potatoes.....	9,023	2,633	.....
Matico leaves.....	4,882	1,830	.....
Nickel ores.....	399	1,745	.....
Lard.....	2,674	1,692	.....
Art objects.....	705	1,590	.....
Shoe leather.....	250	1,000	.....
All other articles.....	159,824	37,521	.02
Total.....	120,710,663	182,612,550	100.00

The proportion between the different classes of Bolivian exports during 1919 was as follows:

Classes.	Quantity.		Value.	
	Kilos.	Percent- age.	Bolivianos.	Percent- age.
Mineral products.....	99,078,272	83.25	126,632,675	87.88
Vegetable products.....	7,675,348	6.44	12,144,485	8.39
Animal products.....	10,935,604	9.18	4,874,499	3.35
Reexported goods.....	1,353,080	1.09	417,681	.27
National manufactures.....	48,914	.04	182,187	.11

According to a more detailed classification the exports of 1919 were as follows:

Articles.	Kilos.	Bolivianos.	Articles.	Kilos.	Bolivianos.
Live animals.....	9,305,465	1,863,601	Tin concentrates.....	48,211,287	99,271,450
Foodstuffs.....	154,995	78,253	Bismuth.....	374,076	3,181,642
Coffee.....	205,427	232,868	Wolfram.....	1,994,769	3,246,501
Hides.....	913,096	656,731	Antimony.....	237,979	132,226
Ostrich feathers.....	1	10	Alpaca wool.....	101,779	517,253
Coca leaves.....	413,050	984,479	Sheep wool.....	425,854	1,362,735
Quinine bark.....	193,981	174,318	Llama wool.....	126,872	405,990
Lumber.....	1,410,119	29,609	Other raw materials.....	194,396	36,793
Rubber.....	5,347,323	10,691,096	Manufactured articles....	1,401,993	599,767
Copper ores and concen- trates.....	22,970,243	5,316,671	Silver ores.....	18,145,857	12,349,384
Lead.....	4,769,281	1,820,130	Silver coin.....	3,958	168,665
Zinc.....	1,901,521	478,362	Total.....	119,091,218	144,251,527
Tin bars.....	287,896	652,993			

EXPORTS BY DEPARTMENTS.

Exports by departments in 1918 were as follows:

Departments.	Quantity.		Value.	
	Kilos.	Percent- age.	Bolivianos.	Percent- age.
Potosi.....	62,777,029	52.01	117,259,599	64.22
Oruro.....	14,966,168	12.40	31,820,420	17.43
La Paz.....	30,137,139	24.97	18,831,685	10.31
Territorio Nacional de Colonias.....	3,921,461	3.25	9,863,531	5.40
Cochabamba.....	752,362	.62	1,739,774	.95
Santa Cruz.....	3,926,370	3.25	1,203,431	.66
Beni.....	846,868	.70	826,247	.45
Tarija.....	1,933,283	1.60	686,503	.37
Chuquisaca.....	1,449,983	1.20	381,660	.21
Total.....	120,710,663	100.00	182,612,850	100.00

EXPORTS BY COUNTRIES OF DESTINATION.

The proportion of Bolivian exports by countries of destination during the period 1913-1919 was as follows:

Countries of destination.	1913		1914		1915		1916	
	Volume.	Value.	Volume.	Value.	Volume.	Value.	Volume.	Value.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Great Britain.....	72.28	80.85	73.48	78.93	66.87	29.99	62.90	65.05
Germany.....	15.95	8.47	9.73	5.61	.05	.67		
France.....	5.50	4.88	5.05	4.04	1.02	.86	1.67	1.08
Argentina.....	2.71	.98	3.02	1.35	3.10	1.52	6.00	2.40
Chile.....	1.57	.64	2.53	1.88	1.16	.78	4.74	2.26
Belgium.....	1.27	3.38	.79	2.87				
United States.....	.29	.60	5.31	3.72	26.51	26.28	23.90	28.47
Brazil.....	.27	.02	.01	.01	.85	.17	1.10	.45
Peru.....	.02	.04	.07	1.54	.22	.68	.21	.20
Other countries.....	.14	.14	.01	.05	.22	.25	.08	.29

Countries of destination.	1917		1918		1919	
	Volume.	Value.	Volume.	Value.	Volume.	Value.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Great Britain.....	50.88	57.26	35.03	41.61	31.35	49.28
France.....	2.52	2.72	.91	.16	1.19	1.74
Argentina.....	4.35	1.54	5.46	5.24	7.42	2.00
Chile.....	5.16	1.93	5.05	1.51	12.97	5.12
United States.....	35.69	36.07	41.13	49.85	41.77	41.34
Brazil.....	1.15	.12	1.13	1.22	1.46	.10
Peru.....	.18	.21	1.09	.28	.12	.18
Other countries.....	.07	.15	.20	.13	.38	.24

Exports to the United States by classes in 1918, according to Bolivian figures, were as follows:

Classes.	Kilos.	Bolivianos.	Classes.	Kilos.	Bolivianos.
Hides and skins:			Bismuth bars.....	450	6,655
Cow.....	121,467	97,173	Wolfram concentrates.....	2,539,213	7,983,355
Goat.....	23,766	14,259	Antimony ores.....	357,430	382,450
Sheep.....	81,685	16,355	Nickel ores.....	399	1,745
Llama.....	8,339	16,660	Mineral samples.....	126	58
Alpaca.....	814	1,628	Alpaca wool.....	9,238	23,927
Deer.....	1,694	2,261	Sheep wool.....	382,433	726,651
Others.....	81	238	Llama wool.....	41,446	76,207
Quinine bark.....	122,779	107,864	Chemicals.....	137	3,425
Matico leaves.....	4,625	1,980	Manufactured furs.....	14	490
Rubber:			Other manufactures.....	18	70
Fine.....	2,404,334	6,966,424	Manufactured iron goods.....	4,667	4,210
Other grades.....	1,212,618	2,345,717	Household utensils.....	496	1,900
Dye and tanning woods.....	97	200	Silver:		
Copper:			Ores.....	11,087,369	2,102,313
Concentrates.....	3,749,490	2,817,859	Sulphides.....	22,720	524,610
Cement.....	5,119	4,098	Cement.....	129,387	810,829
Sulphides.....	1,900,000	129,913	Coin.....	2,536	106,724
Ores.....	19,290,440	4,022,534	Total.....	64,720,087	75,991,792
Lead ores.....	25,250	9,726			
Tin:					
Bats.....	91,628	287,928			
Concentrates.....	18,097,791	46,093,659			

Exports to the United States in 1919, according to Bolivian figures, amounted to 53,302,618 kilos, representing a value of 59,583,252 bolivianos, or, respectively, 41.77 per cent and 41.34 per cent of the total figures for the foreign commerce of the country. Exports of

tin to the United States had a value of 41,519,062 bolivianos and those of rubber a value of 6,836,483 bolivianos. Between 1913 and 1918, inclusive, Bolivian exports to the United States increased from 548,596 to 75,991,792 (or about 137 times the pre-war exports). Of the exports of 1913, 539,520 bolivianos represented rubber. During the same period imports from the United States increased only from 4,044,103 to 11,311,209 bolivianos.

The growth of Bolivia's trade with the United States during the period 1910-1918 is graphically shown by the following chart (the figures at the sides indicating value in millions of bolivianos):

FIG. 19.—Graphic representation of Bolivian trade with United States.

The foregoing statistics of exports to the United States represent the official Bolivian figures, as published in the "Comercio Especial de Bolivia." Declared export figures, in customary English units of quantity and with the values in United States currency, are also submitted by American consular officers. Exports declared at the consulate at La Paz, Bolivia, for the United States during 1920 totaled \$19,285,583, thereby trebling those of the preceding year, which totaled \$6,191,085. Tin ore leads these exports both in quantity and in value, aggregating 51,147,397 pounds, worth \$17,096,096, in 1920, against 11,084,536 pounds, worth \$3,052,105, in 1919. Copper ore is second, with 13,255,718 pounds, worth \$986,776, in 1920, and 22,663,783 pounds, worth \$1,194,948, in 1919. A considerable amount of Bolivian exports to the United States, especially tin and copper ore, during the years 1919 and 1920, were invoiced at Arica, Chile, and are shown under statistics of exports from that port.

Exports to Great Britain in 1919 had a total volume of 37,335 metric tons and a value of 71,121,336 bolivianos, or, respectively, 31.35 per cent and 49.28 per cent of the total volume of Bolivia's exports. The principal exports consisted of tin to the value of about 55,000,000 bolivianos and silver to a value of more than 6,000,000

Bolivia exported to Chile in 1919 15,455 metric tons of merchandise, valued at 7,380,909 bolivianos, a large part of which was later reexported. According to Bolivian statistics, tin concentrates valued at 2,181,143 bolivianos and silver ores to a value of 3,971,729 bolivianos were exported to Chile.

Exports to Argentina amounted to 8,888,731 kilos, valued at 2,880,827 bolivianos. Chief among these were: Cattle, 1,575,860 bolivianos; coca leaves, 794,558 bolivianos; lead ores, 220,633 bolivianos; and silver coin, 168,663 bolivianos.

IMPORTS BY CLASSES OF GOODS.

Imports by general classes during 1918 were as follows:

Classes.	Quantity.		Value.	
	Kilos.	Percent- age.	Bolivianos.	Percent- age.
Live stock (37,056 head).....	5,638,655	3.09	2,040,632	5.83
Foodstuffs and liquors.....	38,645,609	25.70	8,957,367	25.59
Raw materials, etc.....	87,090,839	58.60	7,022,630	20.07
Manufactured goods.....	18,960,143	12.61	16,229,072	46.37
Gold and silver coin.....	484		750,185	2.14
Total.....	150,335,730	100.00	34,999,886	100.00

The volume of imports, according to the most important items, for the years 1918 and 1919, was as follows:

Articles.	1918	1919	Articles.	1918	1919
	Kilos.	Kilos.		Kilos.	Kilos.
Coal.....	36,121,372	24,883,314	Cement.....	5,030,089	4,872,351
Flour.....	18,163,349	16,719,783	Gold coin.....	478	3,436
Sugar.....	8,450,901	9,103,379	Other merchandise.....	53,367,140	45,397,422
Railway ties.....	15,452,962	8,626,981			
Lumber.....	14,049,139	6,374,337	Total.....	150,335,730	115,981,033

IMPORTS BY DEPARTMENTS.

The destination of these imports by Departments of the Republic was as follows:

Departments.	1918	1919	Departments.	1918	1919
	Kilos.	Kilos.		Kilos.	Kilos.
Potosi.....	18,237,283	40,924,782	Tarija.....	682,365	1,014,632
La Paz.....	50,711,835	37,583,283	Chuquisaca.....	401,568	887,981
Oruro.....	15,469,287	30,197,632	Santa Cruz.....	630,202	453,459
Cochabamba.....	909,661	2,174,835			
El Beni.....	4,279,041	1,563,737	Total.....	150,335,730	115,981,033
Territorio Nacional de Colonias.....	2,014,188	1,181,292			

Of the total volume of imports in 1919, 32.39 per cent was consumed in the Department of Potosi; 32.40 per cent in that of La Paz; 26.03 per cent in Oruro; and only 6.28 per cent in the rest of the country. However, the relative value of the imports by Depart-

ments was 45 per cent for La Paz, 22 per cent for Potosi, 21 per cent for Oruro, and 12 per cent for the remainder of the country.

Imports by classes into each Department during 1918 were as follows:

Departments and classes.	Kilos.	Bolivianos.	Departments and classes.	Kilos.	Bolivianos.
Department of La Paz:			Department of El Beni—Continued.		
Livestock (4,686 head)	433,720	161,992	Manufactured goods..	389,574	411,570
Foodstuffs and liquors	20,524,433	4,561,468	Total.....	1,279,041	682,733
Raw materials, etc...	22,789,969	1,855,156	Department of Cochabamba:		
Manufactured goods..	6,963,231	6,110,753	Livestock (373 head).	36,190	27,850
Gold and silver coin..	482	750,185	Foodstuffs and liquors	298,310	91,108
Total.....	50,711,835	13,439,554	Raw materials, etc...	73,070	27,727
Department of Potosi:			Manufactured goods..	502,091	545,472
Livestock (28,506 head).....	3,533,925	1,539,803	Total.....	909,661	692,157
Foodstuffs and liquors	6,563,018	1,410,600	Department of Tarija:		
Raw materials, etc...	33,197,512	2,680,837	Livestock (662 head).	63,650	28,570
Manufactured goods..	4,942,828	4,081,994	Foodstuffs and liquors	401,918	97,897
Total.....	48,237,283	9,743,234	Raw materials, etc...	13,645	2,102
Department of Oruro:			Manufactured goods..	203,152	346,403
Livestock (32 head) ..	9,600	9,552	Total.....	682,365	474,972
Foodstuffs and liquors	8,634,374	2,068,107	Department of Santa Cruz:		
Raw materials, etc...	31,387,470	2,411,218	Livestock (1,373 head)	276,800	153,000
Manufactured goods..	5,437,843	4,000,235	Foodstuffs and liquors	183,899	46,506
Total.....	45,469,287	8,489,112	Raw materials, etc...	12,647	2,221
Territorio Nacional de Colonias:			Manufactured goods..	156,852	226,850
Foodstuffs and liquors	1,392,342	433,004	Total.....	630,198	428,577
Raw materials, etc...	394,057	24,293	Department of Chuquisaca:		
Manufactured goods..	228,119	290,649	Livestock (729 head).	136,990	46,725
Total.....	2,014,488	747,946	Foodstuffs and liquors	96,806	36,445
Department of El Beni:			Raw materials, etc...	31,318	3,278
Livestock (695 head).	147,780	73,110	Manufactured goods..	136,451	215,150
Foodstuffs and liquors	550,537	182,228	Total.....	401,568	301,598
Raw materials, etc...	191,150	15,795			

IMPORTS BY CUSTOMHOUSES.

The imports by the different customhouses during 1919 were as follows:

Customhouses.	Kilos.	Percent- age.	Customhouses.	Kilos.	Percent- age.
Uyuni.....	38,552,243	33.24	Abuna.....	612,760	0.53
Oruro.....	30,430,503	26.25	Cobija.....	568,531	.48
La Paz.....	26,584,586	22.91	Puerto Suarez.....	275,169	.21
Corocoro.....	9,563,482	8.21	Tarija.....	38,736	.03
Villazon.....	6,833,133	5.90	Total.....	115,981,033	100.00
Villa Bella.....	1,517,237	1.31			
Yacuiba.....	1,004,653	.87			

IMPORTS BY COUNTRIES OF ORIGIN.

Total imports into Bolivia according to countries for the period 1914-1918 were as follows:

Countries.	1914	1915	1916	1917	1918
United States.....	(kilos..... 34,223,923	23,147,407	41,322,931	36,649,461	44,510,341
.....(bolivianos..	4,636,751	4,766,291	9,394,797	11,167,398	11,311,209
Chile.....	(kilos..... 52,402,738	25,201,973	54,016,193	67,168,856	66,937,532
.....(bolivianos..	5,487,293	3,373,235	6,380,646	7,885,206	8,080,679
Great Britain.....	(kilos..... 9,583,750	10,072,022	9,708,450	12,020,520	12,002,364
.....(bolivianos..	7,808,760	3,634,187	4,116,226	4,061,336	4,144,971
Peru.....	(kilos..... 12,490,454	13,591,971	11,276,381	16,733,868	12,788,705
.....(bolivianos..	2,855,578	4,271,012	4,275,808	4,469,962	4,368,511
Argentina.....	(kilos..... 9,116,961	5,137,751	8,542,192	6,008,914	8,172,786
.....(bolivianos..	2,579,838	1,475,869	2,113,933	2,157,395	3,799,705
Germany.....	(kilos..... 24,833,387	1,625,007	42,331	35,768	58,448
.....(bolivianos..	10,625,300	1,075,772	38,022	15,305	53,109
Belgium.....	(kilos..... 8,211,456	2,491,437	4,550,384	858,046	.....
.....(bolivianos..	2,306,322	924,345	1,662,208	96,435	.....
Brazil.....	(kilos..... 2,915,194	2,567,177	2,807,374	3,355,367	2,826,445
.....(bolivianos..	790,616	831,880	960,130	1,170,831	1,029,222
France.....	(kilos..... 948,925	349,687	349,524	458,281	454,106
.....(bolivianos..	1,058,343	124,595	631,866	731,357	676,406
Italy.....	(kilos..... 1,025,174	682,013	404,670	228,982	158,401
.....(bolivianos..	763,274	614,944	462,069	422,583	355,956
Spain.....	(kilos..... 507,186	302,326	436,483	531,847	435,498
.....(bolivianos..	528,420	245,807	444,366	613,949	621,529
China.....	(kilos..... 943,909	1,007,391	899,399	2,184,839	929,403
.....(bolivianos..	133,618	140,925	125,991	312,267	130,116
Netherlands.....	(kilos..... 39	708,536	125,511	31,737	3,700
.....(bolivianos..	190	533,738	59,757	15,193	3,100
India.....	(kilos..... 100,952	1,158,623	845,159	202,576	698,084
.....(bolivianos..	14,133	168,555	129,119	33,838	118,062
Sweden.....	(kilos..... 12,936	12,936	88,067	105,911	182,126
.....(bolivianos..	.....	3,647	27,114	52,105	112,187
Portugal.....	(kilos..... 81,585	8,057	22,036	59,329	16,492
.....(bolivianos..	65,686	8,512	27,612	54,052	20,415
Uruguay.....	(kilos..... 136,855	38,493	78,675	128,919	53,788
.....(bolivianos..	41,238	10,814	28,999	49,092	42,790
Denmark.....	(kilos..... 3,426	59,244	283,067	212,048	13,499
.....(bolivianos..	1,713	48,409	86,172	25,994	6,567
Japan.....	(kilos..... 53,442	15	1,177	12,300	48,564
.....(bolivianos..	8,189	718	4,117	27,519	75,189
Other countries.....	(kilos..... 116,217	42,344	123,831	276,388	45,444
.....(bolivianos..	52,948	21,271	98,739	115,967	50,092
Total.....	(kilos..... 157,725,873	88,204,500	138,953,841	147,267,227	150,335,726
.....(bolivianos..	39,758,210	22,574,556	31,007,931	33,480,817	34,999,875

The proportion of imports by countries of origin during the two years 1913 and 1918 was as follows:

Countries.	1913		1918	
	Bolivianos.	Percent- age.	Bolivianos.	Percent- age.
United States.....	4,044,103	7.38	1,341,209	32.31
Chile.....	5,559,472	10.15	8,089,679	23.11
Great Britain.....	11,101,268	20.27	4,144,971	11.85
Peru.....	3,023,757	5.53	4,368,511	12.48
Brazil.....	991,883	1.82	1,029,222	2.91
France.....	2,058,142	3.76	676,406	1.93
Italy.....	1,303,199	2.37	355,956	1.01
Germany.....	20,091,363	36.50	53,109	.02
Other countries.....	6,571,849	12.22	4,970,823	14.35

Imports from the United States in 1913 were classified as follows:

Articles.	Bolivianos.	Articles.	Bolivianos.	Articles.	Bolivianos.
FOODSTUFFS.		MANUFACTURED ARTICLES.		MANUFACTURED ARTICLES—continued.	
Lard.....	85,494	Drugs.....	71,446	Agricultural imple-	
Flour.....	1,237,480	Shoes.....	88,059	ments.....	33,977
Other articles.....	276,954	Cotton fabrics.....	409,053	Railroad cars.....	936
Total.....	1,599,928	Printed articles.....	236,634	Automobiles.....	1,855
RAW MATERIALS.		Iron sheets and bars.....	60,952	Guns and ammuni-	
Lumber.....	226,705	Other iron manufac-	201,644	tion.....	65,767
Mineral oils.....	54,238	tures.....	68,506	Other articles.....	706,635
Coal.....	10,086	Mining machinery.....	2,856	Total.....	2,083,504
Cement.....	29,033	Typewriters.....	63,915	Grand total....	4,044,103
Other.....	40,609	Sewing machines.....	37,593		
Total.....	360,671	Other machines.....	23,292		
		Tools for laborers.....	10,384		
		Mining tools.....			

The principal imports from the United States in 1918 were as follows:

Articles.	Kilos.	Bolivianos.	Articles.	Kilos.	Bolivianos.
Explosives.....	763,800	1,116,890	Condensed milk.....	643,497	193,049
Railway ties.....	10,686,552	1,068,655	Crude petroleum.....	2,317,367	185,389
Mining machinery.....	1,488,726	706,825	Other mineral oils.....	1,212,169	179,571
Automobiles and acces-			Iron and steel.....	886,762	176,462
sories.....	202,486	464,119	Musical instruments.....	72,288	169,169
Unbleached cottons ("to-			Shellfish and canned fish..	304,159	156,495
cuyos").....	427,580	427,580	Railway cars.....	183,620	154,366
Cottons in general.....	245,519	302,415	Wire.....	105,689	142,429
Stearin and paraffin.....	1,272,381	326,005	Electrical goods.....	46,416	117,155
Lumber.....	10,707,805	308,793	All other articles.....	9,495,667	4,344,353
Flour.....	1,768,797	283,007	Total.....	44,510,341	11,311,209
Steam engines.....	193,918	280,562			
Rice.....	1,485,143	207,920			

The principal imports from the United States during 1919 consisted of the following goods:

Articles.	Bolivianos.
Mining machinery.....	2,167,254
Unbleached cottons ("tocuyos").....	1,392,993
Other cotton textiles.....	1,603,613
Sacks for ores.....	830,199

The total value of imports from the United States in 1919 was more than 23,500,000 bolivianos, or more than double that for 1918.

The principal imports from other countries during 1919 were as follows:

Countries and articles.	Bolivianos.	Countries and articles.	Bolivianos.
Great Britain:		Peru:	
Cotton textiles.....	1,973,000	Sugar.....	4,032,813
Woolen textiles.....	1,162,588	Unbleached cottons ("tocuyos")..	454,967
Sacks for ores.....	1,626,706	Mineral oils.....	391,509
Coal.....	549,547	Argentina:	
Chile:		Flour.....	399,759
Flour.....	4,371,958	Cotton textiles.....	178,641
Coal.....	1,215,326	Live stock.....	1,828,271

PRINCIPAL LINES OF GOODS IMPORTED.

HARDWARE.

In any consideration of this market it must be borne in mind that Bolivia is essentially a mining country, and that all other industries are in a comparatively low state of development. There are few manufactures, and these operate on a small scale. Agriculture is carried on in a quite primitive fashion and with the fewest tools possible. The mechanical trades, such as carpentry, require, as now conducted, a minimum of equipment. There is a fair demand for miners' tools of all kinds, and the railways use a large amount of hardware of all sorts. While American goods have gained a very strong position in the Bolivian hardware market since the beginning of the war, much of the distribution is in the hands of Germans. One large German house has branches in nearly all the important cities of the plateau.

Imports of some classes of hardware during 1918 were as follows:

Classes.	Total.	From United States.	Classes.	Total.	From United States.
	<i>Bolivi- anos.</i>	<i>Bolivi- anos.</i>		<i>Bolivi- anos.</i>	<i>Bolivi- anos.</i>
Carpenters' tools	155,465	49,503	Locks.....	60,590	48,817
Miners' tools.....	30,988	11,948	Copper and brass goods.....	37,260	8,122
Agricultural implements.....	22,313	8,776	Enameled ironware.....	54,223	36,504
Farming tools.....	42,034	16,761	Firearms.....	38,142	29,653
Wire.....	193,546	142,429	Ammunition.....	36,237	31,565

In 1916 the Bureau of Foreign and Domestic Commerce published a monograph entitled "Markets for American Hardware in Chile and Bolivia," Miscellaneous Series No. 41, the price being 25 cents.¹

CONSTRUCTION MATERIALS.

The Bolivian market for construction materials is covered in detail in Special Agents Series No. 188, by W. W. Ewing, entitled "Construction Materials and Machinery in Argentina and Bolivia," price 20 cents. Increasing quantities of imported cement are being used in construction work, even in reinforced concrete work in La Paz. Nearly all the lime used is produced locally. Rough bricks are made in all parts of the country, but there is a limited demand for fire brick. Most of the lumber used comes from our Pacific States (largely redwood and Oregon pine), though Chilean lumber is being imported in increasing quantities. Considerable amounts of "calamina," or galvanized sheets, are used for roofing, as well as for warehouse and temporary construction. Red tiles, which are used widely for roofing, are produced locally. Most of the builders' hardware is imported from the United States. With the completion of the projected sanitary works in most of the important plateau cities, there should be a good market for plumbing and bath-room supplies. Good lines of these are now carried in La Paz, in spite of the limited use.

¹ The publications mentioned in this and the succeeding sections may be obtained from the district or cooperative office on the Bureau or from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Among different classes of construction materials imported in 1918 were the following:

Articles.	Total.		From United States.	
	Metric tons.	Bolivianos.	Metric tons.	Bolivianos.
Portland cement.....	5,030	251,504	1,910	95,529
Lumber:				
Unplaned.....	13,485	396,395	10,707	308,793
Planed.....	563	16,917	329	9,870
Galvanized sheets for roofing.....	179	22,405	(1)	(1)
Window glass.....	120	31,022	98	25,387

¹ Mostly reexports from Chile.

MINING MACHINERY.

Mining machinery forms one of the most important lines of trade in Bolivia. The tendency to modernize the mining plants of the country and the general expansion of the industry have created a strong demand for mining equipment, which must continue for some time to come. Several modern "ingenios" or concentration plants have been installed during the past few years or are now in course of installation. In addition to equipment for concentrating and reduction plants, there is a demand for ore cars and tracks, "andariveles" or cableways, belt conveyors, pumps for draining mines, drills, Diesel engines, machine-shop equipment, etc. A large part of the mining machinery now in use is of American manufacture, and the trade is well covered by the La Paz and Oruro representatives of the leading American houses in these lines. Increased investments of American capital in Bolivian mines, now under way and in prospect, should greatly strengthen the position of the United States in this market. The British mine companies are disposed to buy in England, and German houses were trying to reenter the field before the end of 1920. This market is described in Special Agents Series No. 118, by J. S. Massel, entitled "Markets for Machine Tools in Peru, Bolivia, and Chile," price 10 cents. However, this report was prepared in 1915, since which time there have been very important developments in this field.

Imports of mining machinery proper for the years 1914-1918 were as follows: 1914, 412,727 bolivianos; 1915, 212,680 bolivianos; 1916, 366,974 bolivianos; 1917, 1,040,819 bolivianos; 1918, 1,033,260 bolivianos. The value of imports from the United States in 1918 amounted to 706,825 bolivianos and those from Chile to 129,884 bolivianos, the latter consisting of reexported merchandise.

ELECTRICAL GOODS.

Persons especially interested in the market for electrical goods should consult Special Agents Series No. 167, prepared by Philip S. Smith and entitled "Markets for Electrical Goods in Bolivia and Chile," price 20 cents. There are electric power plants in all the leading cities of the Bolivian plateau, furnishing current for light and power purposes. The only cities with tramway service are La Paz and Cochabamba. La Paz, Cochabamba, Oruro, Potosi, and Sucre

are equipped with telephone systems. More information regarding the power companies in these cities will be found in other parts of this handbook. In some places, as in La Paz, the power company also sells electrical goods, such as lamps and heaters. There is a large field in Bolivia for the extension of the use of electrical heating appliances. The large mining camps, such as Uncia, Llallagua, Corocoro, and Pulacayo have their own power installations. There are great possibilities for the further development of the hydroelectric industry in Bolivia, and an elaborate survey has been made by an American company with a view to the utilization of the large supply of water power on the eastern slopes of the Bolivian Andes. The section of the Guaqui-La Paz Railway from the "alto" above La Paz down into the city has been electrified, studies have been made for the same purpose by the Yungas Railway, and the electrification of most of the railway system of the country has been seriously discussed. Though the United States now holds first place in the market for electrical goods, German houses are strongly represented in this field.

The total value of goods imported in 1918 for lighting and power purposes was 294,708 bolivianos. Of this, 117,155 bolivianos represented direct importations of American goods, 65,142 bolivianos of reexported goods is credited to Chile, and imports from France and Great Britain amounted to 36,057 and 34,982 bolivianos, respectively. Imports of telegraph equipment amounted to 92,594 bolivianos—53,863 bolivianos of this coming from the United States.

MOTOR VEHICLES.

The market for motor vehicles is covered in Commerce Reports for June 26, 1920, under the title of "Bolivia and Ecuador as Automobile Markets."

FOODSTUFFS AND GROCERIES.

The prevailing low standard of living and small buying capacity of the average Bolivian is the most important factor in deciding the value of this market. Only a small minority are able to buy foreign prepared foodstuffs, though the consumption of such bulky commodities as rice, flour, and sugar is very considerable. However, an increasing tendency is evident among the "cholo" class to buy imported foods, such as canned goods. The Indians live on the products of their own harvests. The plateau region is not self-sufficient, and large quantities of such staples as rice, flour, and sugar are imported. For example, foreign flour in large quantities is brought into Cochabamba, the center of an important cereal-growing region. The vast agricultural region of eastern Bolivia is too far from the plateau market to supply it in any quantities. Fresh fruits are obtainable for most of the year, being largely brought up from the semitropical or tropical valleys on the eastern slopes of the mountains, so the market for canned or dried fruits is small. However, American canned goods (especially canned salmon) are found for sale in nearly every village in Bolivia.

There are at least two high-class groceries in La Paz, and some good stores of the same kind in Oruro and Cochabamba. The Jugo-Slavs control the retail grocery business in Oruro and Potosi and are in-

creasingly prominent in Cochabamba, Sucre, and Uyuni. There are numerous small "pulperías" or shops in every town, where a small stock of groceries and drinks are kept for sale, usually by women of the cholo class.

Among imports of some of the staple lines of foodstuffs in 1918 were the following:

Articles and countries of origin.	Kilos.	Bolivianos.	Articles and countries of origin.	Kilos.	Bolivianos.
Sugar: ¹					
Total.....	8, 150, 901	2, 443, 970	Prepared meats ⁴	31, 374	29, 564
Peru.....	7, 742, 963	2, 323, 588	Canned fish and shellfish:		
Brazil.....	172, 770	51, 831	Total.....	209, 938	167, 950
Rice:			United States.....	150, 388	127, 510
Total.....	4, 397, 758	615, 686	Tea:		
United States.....	1, 485, 143	207, 920	Total.....	190, 763	95, 351
Chile.....	953, 128	133, 437	United States.....	80, 509	40, 250
China.....	929, 403	130, 116	Coffee ⁵	71, 732	72, 585
Peru.....	442, 104	61, 894	Spices ⁶	465, 590	203, 175
Flour: ²			Canned vegetables:		
Total.....	18, 163, 349	2, 906, 135	Total.....	33, 758	27, 007
Chile.....	13, 806, 775	2, 209, 084	Chile.....	12, 219	9, 775
Argentina.....	2, 229, 767	356, 762	United States.....	8, 854	7, 083
United States.....	1, 768, 797	283, 007	Dried fruits:		
Lard:			Total.....	127, 771	37, 742
Total.....	353, 373	106, 138	Chile.....	86, 543	19, 409
Brazil.....	181, 191	54, 357	United States.....	16, 060	8, 703
United States.....	87, 340	26, 328	Canned or preserved fruits:		
Butter ³	66, 063	33, 031	Total.....	52, 761	87, 462
Cheese.....	22, 728	6, 818	United States.....	23, 213	39, 612
Condensed milk:			Chile.....	18, 836	31, 131
Total.....	817, 472	245, 241			
United States.....	643, 497	193, 049			

¹ During 1917 11,998,752 kilos of sugar were imported, and during 1919 9,103,379 kilos.

² During 1917 imports of flour amounted to 23,756,653 kilos and during 1919 to 16,719,783 kilos. During 1918 322 metric tons of wheat were imported, largely from Chile.

³ Peru, Argentina, Denmark, and Brazil are the principal suppliers of butter to Bolivia, in the order named.

⁴ Mostly from Chile and Brazil.

⁵ Largely from Brazil.

⁶ More than half of these consist of the "aji" pepper of the neighboring countries.

TEXTILES.

The textile market is described in detail in Special Agents Series No. 158, prepared by W. A. Tucker and entitled "Textile Markets of Bolivia, Ecuador, and Peru," price 15 cents. Bolivia offers a good market for certain grades of both woollens and cottons. Because of the cool climate of the plateau the whites and better-class "cholos" wear woolen clothing throughout the year. The women of the "cholo" class and some of the Indian women wear skirts (several of them being often superimposed) which are made of bright-colored baize, or "bayeta," as it is locally known. Most of this demand is met by imports from Great Britain. The Indian women weave a large number of rough woolen garments for their own use, and a considerable proportion of the "cholos" wear suits made of native weaves. Some of these brownish-gray patterns are not unattractive, and the writer has seen suits made of this homespun cloth worn by women of the more well-to-do class in La Paz. However, the production of these woollens has not been organized on an industrial scale.

There is a large demand among the Indian and "cholo" classes in Bolivia for the gray and white cotton sheetings known locally as "tocuyos." At present the United States supplies the larger part

of these goods, but Peru has entered the market and is a potential competitor of importance. The white-goods trade was largely British before 1917, though the Germans held a strong position in other lines, especially in cheap flanelettes and cassinettes. There are fair imports of gingham, percales, drills, corduroys, and tickings from the United States. The market for silks in Bolivia is very small, as their price places them out of reach of all but a small part of the buying population.

Imports of the principal textiles in 1918 were as follows:

Articles and countries of origin.	Kilos.	Bolivi- anos.	Articles and countries of origin.	Kilos.	Bolivi- anos.
Woolens:			Cotton—Continued.		
“Baveta”——			Other cottons—		
Total.....	65,916	173,225	Total.....	960,474	1,381,486
Great Britain.....	62,294	163,808	Great Britain.....	475,005	746,255
Other woolens.....	6,015	19,567	United States.....	215,519	302,415
Wool mixed with cotton.....	2,510	9,239	With silk mixture—		
Cotton:			Total.....	7,802	50,470
Suitings (“cassinettes”)——			Great Britain.....	5,090	31,167
Total.....	239,688	290,323	Silks:		
Spain.....	48,448	60,589	Pure silk.....	1,210	42,028
United States.....	40,439	47,015	Silk mixed with cotton.....	761	23,753
Italy.....	40,289	51,696	Cassimeres:		
Bleached (“genero blanco”)——			Total.....	168,190	403,875
Total.....	244,112	306,411	Great Britain.....	116,008	262,687
Great Britain.....	222,978	278,956	Peru.....	20,679	51,082
United States.....	10,244	13,751	Cloth for making women’s clothing, exclusive of silk:		
Unbleached (“tocuyos”)——			Total.....	233,365	615,506
Total.....	686,896	686,898	Great Britain.....	140,529	358,456
United States.....	427,580	427,580	United States.....	56,719	116,511
Peru.....	112,684	142,684			

READY-MADE WEARING APPAREL.

This market is covered with great thoroughness in Miscellaneous Series No. 69, prepared by former Commercial Attaché W. A. Montavon and entitled “Wearing Apparel in Bolivia,” price 10 cents. This field can be roughly divided into three classes of demand, depending on whether the consumer is white, “cholo,” or Indian, though there is a tendency among the two lower classes to imitate the clothing of the class immediately above it. The demand among the white minority of the population is similar to that prevailing among the same class throughout South America. This element of the people dresses well, and with a strict regard for the dictates of fashion, though in some respects the styles it follows differ from those in vogue in the United States. There is little color in the clothing of this class, whereas the garb of the Bolivian Indians is probably the most highly colored in South America. The Indian market has been almost entirely ignored by foreigners, except by the Germans in the matter of ponchos. In view of the limited demand and small spending capacity of the Indian class this field offers little to the exporter of wearing apparel of whatever kind. Though the same condition is largely true of the lower strata of the “cholo” masses, whose social status approximates closely to that of the Indian, the higher-class cholos are constantly taking a larger amount of foreign-made wearing apparel.

Most of the men’s suits are tailor-made in local shops, and few ready-made suits are imported. Leather suits, of good quality and suitable for wear in the mining camps, are made by a La Paz firm.

Some custom-made shirts are sold, but several lines of American makes of shirts and collars are carried by the haberdashery shops and have an increasingly good sale. There is little demand for light-weight underwear, and medium and heavy weight grades are worn all the year. The trade is not yet accustomed to the union suit and prefers the two-piece arrangement of underclothing. There is a good demand for overcoats, which are mostly tailored locally. Both felt and straw hats find a good sale, and it is common in La Paz to see a man wearing an overcoat and a straw hat at the same time. Italian felt hats hold a strong position, but English-made hats are sold in fair quantities. American suspenders and hose supporters have little competition, and American socks are beginning to have a good sale. There are some very good haberdasheries in La Paz and one or two attractive stores in Oruro and Cochabamba.

The market for ready-made garments for women is better developed in Bolivia than in the case of men's clothing. There are few local "modistas" or dressmakers able to compete with the foreign-made products. A good class of women's clothing is being ordered in increasing quantities from New York and Paris. This applies, however, only to the more well-to-do class of white women, and to a lesser extent to the "cholas," who have begun to buy even fancy imported lingerie. Here, as in many other fields, the cholo trade is decidedly worthy of cultivation by foreign exporters. Good stocks of women's wearing apparel are kept in several La Paz stores, and lower-grade garments are sold in large quantities by the numerous shops on Calle Diez de Medina, as well as in other cities of the plateau. American hosiery, corsets, underwear, lingerie, shirt waists, and suits are well represented, in spite of the strong British and French competition in this market.

Some of the most important imports of wearing apparel in 1918 were as follows:

Articles and countries of origin.	Bolivianos.	Articles and countries of origin.	Bolivianos.
Men's felt hats:		Neckties:	
Total.....	349,411	Total.....	29,584
Italy.....	158,167	Great Britain.....	9,152
Great Britain.....	97,315	United States.....	7,105
Argentina.....	56,308	Miscellaneous men's furnishings.....	48,992
France.....	16,381	Women's dresses ("vestidos"):	
United States.....	7,558	Total.....	398,585
Straw hats of all kinds:		Argentina.....	132,766
Total.....	144,675	Spain.....	68,098
Great Britain.....	36,734	France.....	93,221
Peru.....	76,422	United States.....	61,174
Italy.....	10,585	Knit goods:	
Trimmed hats for women:		Total.....	137,746
Total.....	42,020	United States.....	56,802
Argentina.....	9,766	Lingerie:	
France.....	17,756	Total.....	280,335
United States.....	5,540	Great Britain.....	97,914
Men's shirts:		United States.....	58,176
Total.....	25,648		
United States.....	9,630		
Men's outer garments:			
Total.....	37,432		
United States.....	9,637		

BOOTS AND SHOES.

About half of the population of Bolivia buys no footwear at all, beyond the cheapest kind of sandals. The market for foreign-made shoes is limited to the whites, who constitute only about 15 per cent

of the population, and to the foreign colonies. The majority of these now buy shoes made in the La Paz and Oruro factories of Zamora and Garcia. In fact, it is inevitable that with the further development of the native shoe-manufacturing industry the field for the sale of foreign footwear in Bolivia must decrease to small proportions. The cholo demand is supplied almost entirely by domestic manufactured shoes. The cholas, or women of this class, wear a peculiar type of shoe made only in the country. These are boots about 12 inches high, generally made of colored leathers, with double rows of large buttons, and with buckles and tassels for additional adornment. The market for footwear is covered by Special Agents Series No. 174, prepared by H. G. Brock and entitled "Market for Boots and Shoes in Chile and Bolivia," price 25 cents.

Imports of shoes in 1918 were as follows:

Articles and countries of origin.	Kilos.	Bolivi- anos.	Articles and countries of origin.	Kilos.	Bolivi- anos.
Fine shoes ("calzado fino"):			Shoes made of leather and silk:		
Total.....	4,843	29,575	Total.....	595	5,603
United States.....	1,493	7,996	Spain.....	272	2,597
Argentina.....	1,267	9,450	Leather for use in manufacture		
Patent-leather shoes:			of shoes:		
Total.....	16,339	143,725	Total.....	13,067	62,484
United States.....	7,396	67,090	Argentina.....	7,752	31,408
Argentina.....	1,061	10,636	United States.....	4,239	26,846
Gun-metal shoes ("calzado de munición"):					
Total.....	1,210	4,013			
Argentina.....	129	1,520			
United States.....	300	1,445			

DRUGS AND CHEMICALS.

The market for industrial chemicals is largely limited to the mining companies, the match factory, and the small producers of soap. The market for prepared and proprietary medicines is small. For persons with the living facilities of the white population the climate of the plateau is not unhealthful, and the Indians, whose habits are very unhygienic, are unable to buy any imported medicines. However, there is a good demand on the plateau for such standard remedies as aspirin, and in the tropical plains region for sulphate of quinine. There are well-equipped drug stores in all the leading cities, one in Oruro being especially noteworthy. One of the largest general importing houses sells its own proprietary line over a wide territory, and probably the largest exclusive importer of drugs and chemicals in the country is a German. The "Asistencia Pública" or Public Health Service maintains its own dispensaries for distributing medicine to the poor. There is a large Government hospital at Miraflores in La Paz, and an American hospital is being installed in that city.

In the Government statistics, imports of drugs and chemicals are not classified, such imports for 1918 being given as follows:

Articles and countries of origin.	Kilos.	Bolivianos.
Chemical products:		
Total.....	569,355	361,132
United States.....	219,017	84,077
Chile.....	212,196	223,261
Prepared medicines:		
Total.....	69,458	135,874
United States.....	35,305	70,349

PAPER AND STATIONERY.

This market is covered fully in Special Agents Series No. 143, prepared by R. S. Barrett and entitled "Paper, Paper Products, and Printing Machinery in Peru, Bolivia, and Ecuador," price 10 cents. Imports of newsprint go to supply the needs of a considerable number of small newspapers, whose circulation is generally from 1,000 to 5,000. Weekly periodicals are few, and of small size and circulation. Nearly all the book paper is taken by two La Paz publishing houses, which are also large dealers in general stationery. Most of the work done by the job printers is for the order of the railway offices, banks, government offices, mining companies, and the larger mercantile establishments. A comparatively low grade of stationery is used in the schools, and until recently the social stationery was of uniformly poor quality, but a display of high-class American goods was shown in the windows of the largest La Paz store in July, 1920. In estimating the value of the Bolivian paper market, one must take into account the high proportion of illiteracy, due to the large Indian population, and the low average buying power of the people. The market for wrapping paper is negligible, as goods are generally carried home from the store in a basket by a servant.

Imports of different classes of paper, stationery, and office supplies in 1918 were as follows:

Articles and countries of origin.	Kilos.	Bolivi- anos.	Articles and countries of origin.	Kilos.	Bolivi- anos.
Newsprint:			Cardboard:		
Total.....	155,280	77,634	Total.....	55,556	10,711
United States.....	141,203	70,596	United States.....	48,526	8,890
Office stationery:			Manufactures of cardboard:		
Total.....	147,300	118,967	Total.....	13,402	18,813
United States.....	84,621	51,086	Chile.....	5,916	8,311
Paper for other uses:			Office supplies:		
Total.....	389,639	165,588	Total.....	50,096	58,859
United States.....	256,595	84,446	United States.....	21,324	41,121
Wall paper:			Typewriters:		
Total.....	46,839	22,940	Total.....	42,839	10,444
Great Britain.....	22,772	11,952	United States.....	39,508	9,538
Manufactures of paper:			Printing presses:		
Total.....	62,745	57,880	Total.....	16,439	17,656
United States.....	40,682	35,404	United States.....	10,389	6,296
			Peru (reexported).....	3,778	6,509

FURNITURE.

This field is described in Special Agents Series No. 176, prepared by H. E. Everley and entitled "Furniture Markets of Chile, Peru, Bolivia, and Ecuador," price 25 cents. The market for foreign-made furniture in Bolivia is very limited. Most of the demand is supplied by locally made furniture, which is turned out in carpenter shops, employing only a few men each and equipped with no special cabinetmaking tools. However, the workmanship is good, when the facilities at hand are considered, and the price is less than for similar foreign products. Before the war Germany held first place in exports of furniture to Bolivia, especially of chairs, but most of the finer home furniture came from France, England, and Italy. A gaudy-appearing style, known as "Vienna" furniture, had a considerable demand. The more well-to-do Bolivian classes, who are the only ones able to buy foreign furniture, generally demand ornate period sets for their homes. Most of the office and school furniture comes from the United States, but the market is small.

Imports of furniture in 1918 were as follows:

Classes and countries of origin.	Kilos.	Bolivianos.
Ordinary:		
Total.....	74,551	37,803
United States.....	60,029	30,315
Fine:		
Total.....	31,519	39,067
Argentina.....	13,430	18,455
United States.....	8,802	8,094
"Vienna":		
Total.....	11,710	10,410
Spain.....	10,081	8,064
Tapestried:		
Total.....	9,700	15,520
Italy.....	3,342	5,347
United States.....	3,020	1,832
Other classes.....	2,083	1,046

JEWELRY.

The Bolivian market for jewelry is discussed in Special Agents Series No. 186, prepared by S. W. Rosenthal and entitled "Jewelry and Silverware in Chile, Bolivia, and Peru," price 10 cents. The demand for cheap and showy jewelry is large in Bolivia among the class of "chola" women, who are much given to display. However, only a small percentage of the people are able to buy high-grade jewelry.

Imports in 1918 were as follows:

Classes and countries of origin.	Kilos.	Bolivianos.
Higher grades of jewelry ¹	84	45,860
Lower grades of jewelry:		
Total.....	14,812	86,570
United States.....	5,812	35,665
Watches, clocks, and parts:		
Total.....	1,167	30,792
Argentina.....	630	19,263
United States.....	363	4,591

¹ Largest single imports credited to Argentina.

OTHER CLASSES OF GOODS.

Imports of other classes of goods in 1918 were as follows:

Articles and countries of origin.	Kilos.	Bolivi- anos.	Articles and countries of origin.	Kilos.	Bolivi- anos.
Coal and oils:			Perfumery and cosmetics:		
Coal—			Total.....	25,647	112,071
Total.....	36,121,372	2,621,126	United States.....	9,223	37,130
Chile.....	29,123,288	2,100,562	Photographic and motion- picture supplies.....		36,689
Great Britain.....	6,488,397	484,292	Porcelain ware:		
Gasoline—			Total.....	23,581	12,567
Total.....	940,425	75,233	Japan.....	13,444	7,324
United States.....	622,712	49,816	Railway cars:		
Kerosene—			Total.....	358,214	280,737
Total.....	1,939,173	155,133	United States.....	183,620	154,366
United States.....	943,440	75,475	Sacks for ore:		
Crude petroleum—			Total.....	1,121,164	168,166
Total.....	7,233,393	578,671	Great Britain.....	514,085	77,106
Chile.....	4,895,159	391,612	Sewing machines:		
United States.....	2,317,367	185,389	Total.....	84,560	42,280
Paraffin and stearin—			United States.....	71,187	35,593
Total.....	1,341,115	344,191	Soaps:		
United States.....	1,272,381	326,005	Laundry—		
Other oils, mineral—			Total.....	424,429	211,938
Total.....	1,765,421	269,610	Great Britain.....	263,352	131,399
United States.....	1,212,169	178,571	Toilet—		
Explosives (largely dyna- mite for mines):			Total.....	22,673	33,767
Total.....	1,128,075	1,378,140	United States.....	15,735	24,088
United States.....	766,974	1,123,090	Other grades—		
Leather goods:			Total.....	3,730	2,608
Total.....		39,088	United States.....	1,865	1,305
United States.....		6,805	Toys:		
Musical instruments (largely phonographs):			Total.....	17,830	24,300
Total.....		186,436	United States.....	6,182	9,438
United States.....		169,169	Japan.....	4,334	4,606
Paints and varnishes:			Steam engines:		
Total.....	287,991	183,195	Total.....	472,234	526,135
United States.....	183,195	86,167	United States.....	193,918	280,562

INVESTMENTS.

Some of the factors affecting investments in Bolivia have already been considered in other parts of this handbook. It may be added that the attitude of the Government and of the responsible element of the population, is highly favorable to the introduction of foreign capital for the internal development of the resources of the country. While there is no discrimination against any particular nationality, opinion has been especially favorable in late years to American enterprises. In fact, in no country in South America are the people more sincerely friendly to Americans than in Bolivia. Those interests that leave a reasonable return in the country may expect fair treatment from those in power, but the attitude of the Government is strongly opposed to any effort by foreigners to exploit the national resources without an adequate recognition of the public interest.

Concessions for important industrial privileges or undertakings are generally secured through the National Congress, though the President and the Minister of Public Works and Industry have large authority in such matters. It may also be necessary—or at least advisable—to deal with the prefect of the department in which the enterprise in question is to be located. Negotiations for concessions are liable to be long drawn out, and they demand a man with real diplomatic skill and patience. However, any attempt to influence a favorable decision by a too direct appeal to the self-interest of those in authority may defeat the whole purpose of the negotiations. It is, moreover, necessary to engage a responsible lawyer who is familiar with the law of corporations in his country—preferably one who is affiliated with the political party in power.

BOLIVIAN.

The capital available within the country in Bolivian hands is far from sufficient for the task of developing the national resources. As in most of South America, the native Bolivian has not been inclined to initiate large industrial undertakings. The high rate of interest in the country also generally deters the Bolivian from putting his money into stocks and bonds, unless a high return on his investment is fairly certain. He usually prefers to invest in banks, which satisfy his conservative desire for security, or in real estate, both town and country. However, there have been many marked exceptions to this rule. Among these have been Señors Patiño, Avelino Aramayo, Taborga, and Mendieta in mining, and the Suarez brothers and Señors Vaca Díez, Goytia, Lavadenz, and Zamora in other lines of activity. Moreover, an increasing share of stock in mining companies operating in Bolivia, though organized elsewhere, is held by Bolivians. An example of this is the considerable block of Oploca shares (see p. 130) held in Sucre. Also, the majority of the manufacturing concerns in the country are operated by Bolivians.

AMERICAN.

American investments in Bolivia consist largely of mines, Government loans, and oil lands. The mine holdings include those of the Guggenheims in the Inquisivi district and those of the International Mining Co. in the Yungas region. The Bolivian bonds include those of the Chandler loan of 1917, amounting to \$2,400,000. Two companies organized with American capital—Richmond Levering & Co. and the Argentine-Bolivia Exploration & Development Co. (William Braden interests)—hold large tracts of Bolivian petroleum lands in concession.

BRITISH.

The largest single British interest in Bolivia is the Bolivia Railway and the Bolivian section of the Antofagasta & Bolivia. British investments in mines include the important Aramayo Francke Co., the Penny & Duncan mines at Morococala, the Anglo-Bolivian Tin Co., the Berenguela Tin Mines (Ltd.), the Porco Tin Mines (Ltd.), the Olla de Oro Gold Mining Co., and the Royal Tin Mines of Potosi, Bolivia, (Ltd.). British capital has also been invested in rubber lands in northeastern Bolivia, especially in the properties of the Anglo-Bolivian Rubber Estates (Ltd.) and in the Banco de la Nación Boliviana. British investments in 1911 amounted to about £6,000,000, according to the British consul at La Paz.

FRENCH.

French investments in Bolivia are important and widely diversified. In mining there is considerable French capital in the Corocoro Copper Mines (Ltd.) and in the Compañía Huanchaca de Bolivia. Though Luis Soux and the Bébin Brothers, who hold the largest interests in the Cerro of Potosi, are of French birth, they have been in the country so long that their holdings have lost much of their foreign character. In spite of its English name, the Bolivian General Enterprise Co., which controls most of the public utilities of La Paz, including the electric light plant, tramways, and telephones, is a French concern. There are also important French rubber and trading interests in the lower Beni region, including the firms of Braillard and Picollet.

A large part of the stock of the Banco de la Nación is held in France. Other French investments include the loans of 1910 and 1913, amounting to £2,560,000.

GERMAN.

German investments in Bolivia are not in proportion to the former extent of German trade with that country. Most of the German capital in Bolivia is invested in commercial businesses or in enterprises controlled by these trading houses. In the Amazonian region of the Beni and Santa Cruz, these firms combine trade with the extraction of rubber, as in the case of Zeller, Villinger & Co. and Alfredo Barber & Co. In some parts they are engaged in cattle raising, as with Juan Elsner & Co. and Staudt & Co. Or they are interested in public utilities, as are Gustavo Hinke & Co. in the light and power

companies of Cochabamba and Oruro. In a few cases they have embarked in mining, as Boettiger & Trepp have at Araca. Most of the breweries in the country are German-owned. The Banco Aleman Transatlántico, which has branches in La Paz and Oruro, has done much to promote German investments in Bolivia.

CHILEAN.

One of the most interesting developments in Bolivia within recent years has been the growth of Chilean investments in the Bolivian mines. The most important of these mining companies, with their capitalization, are as follows:

	Capital paid up.	
Compañía Minera de Oruro.....	€320,000	(Bs. 4,000,000)
Compañía San José & Atlantaña.....	400,000	(5,000,000)
Empresa Minera de Vinto.....	40,000	(500,000)
Empresa Porvenir de Huanuni.....	175,000	(2,187,500)
Sociedad Estañífera de Totoral.....	70,850	(885,625)
Compañía Estañífera El Acre.....	75,000	(937,500)
Compañía Huanchaca de Bolivia.....	1,600,000	(20,000,000)
Compañía Estañífera de Llalagua.....	425,000	(5,312,500)
Compañía Oploca de Bolivia.....	168,000	(2,100,000)
Compañía Fortuna de Colquiri.....	50,000	(625,000)
Compañía Corocoro de Bolivia.....	400,000	(5,000,000)
Compañía Araca.....	200,000	(2,500,000)
Sociedad Estañífera de Colcha.....	60,000	(750,000)
Compañía Minera de Monte Blanco.....	500,000	(6,250,000)
Total.....	4,483,850	(56,048,125)

Although these companies are organized in Chile, a large part of the capital invested in them is not Chilean.

FIG. 20.—SHOP FRONT IN POTOSI.

FIG. 21.—CORNER OF MARKET IN ORURO.

FIG. 22.—BANCO DE LA NACIÓN BOLIVIANA IN ORURO.

FIG. 23.—BANCO MERCANTIL IN LA PAZ.

BANKING AND MONEY.

BANKING LAW.

All national banks operating in Bolivia must invest 20 per cent of their capital in shares of the Banco de la Nación, though foreign banks may place this quota in national bonds. All banks are required to maintain a gold reserve amounting to 5 per cent of their total deposits. National banks are required to pay 8 per cent of their net profits to the National Treasury, and foreign banks are required to pay 5 per cent of their gross profits. Private banking houses must pay a tax to the Government of 2,000 bolivianos a year.

BANKS OPERATING IN BOLIVIA.

BANCO DE LA NACIÓN BOLIVIANA.

This semigovernmental bank, the Banco de la Nación Boliviano, was created by national law of January 7, 1911, largely as a protest of La Paz interests against the predominance of the Sucre banks in the financial system of the country. The original capital amounted to 15,937,500 bolivianos, half of which was subscribed by the Government on the basis of a loan placed in Paris. Most of the remainder of the stock was taken by French interests, chiefly by the *Crédit Mobilier*. The bank later absorbed the Banco de Bolivia y Londres, the Banco Agrícola, and the Banco Industrial. In the first case the Banco de la Nación issued in exchange shares which are held by the Anglo-South American Bank. In the other cases the shares issued were taken by Bolivian interests.

The head office of the bank is in La Paz, and there are branches in Cochabamba, Oruro, Potosi, Sucre, Tarija, Uyuni, Santa Cruz, Trinidad, and Riberalta. The administration of the bank was temporarily disrupted by the revolution of July, 1920, at which time the president of the board of directors, Sr. Juan Munoz Reyes, and three of the directors were deported from the country. Among the directors who remained on the board were Mr. Jacob Backus, the general manager of the Antofagasta & Bolivia Railway, and Sr. Jorge E. Zalles, the general manager of the Bolivian business of W. R. Grace & Co. A committee in Paris represents the interests of the French shareholders. A provision in the statutes of the bank places the control of its administration in the hands of its private shareholders, who comprise a majority of the directorate. The Bolivian Government now holds 99,341 out of a total of 151,700 shares, or 65.48 per cent of the stock.

On its creation the Banco de la Nación was invested with the same power of note issue enjoyed by the two Sucre banks and the Banco Mercantil. However, a movement for confining the right of issue to the new bank culminated in a law of 1914 which granted the Banco de la Nación the exclusive privilege of issuing notes. The bank was obliged to grant a loan to the Government equal to 4 per cent of the

amount of the notes to be issued, and without interest. It was authorized to issue notes up to 150 per cent of its paid-up capital, which could be raised to £4,000,000 (\$19,466,000). These notes were to be issued in denominations of from 5 to 500 bolivianos. The bank was required to cover 30 per cent of its notes in gold, and after 1918 this proportion was to be increased annually by 2 per cent until it reached 50 per cent of the bank's note issue. The other three banks which had had the right of issue were compelled to withdraw their notes from circulation by July 1, 1916, but these banks were later allowed a period of 10 years in which to liquidate their outstanding note issues. On June 30, 1913, the three banks had in circulation notes to the value of 19,942,000 bolivianos, or an equivalent of £1,596,100 (\$7,767,421), while their combined gold reserves amounted to only £1,131,700. As a result, they early began to call in their investments, and the Sucre banks curtailed their credit, while the interest on short-time loans rose to 12 per cent and on accounts current to 10 per cent. Shares in the Banco Nacional and the Banco Argandoña fell 30 per cent. The situation created by the law has continued to cause much bitterness between the interests represented by the Banco de la Nación and its rivals, because of the advantageous position that the former was enabled to take in the banking system of the country.

The bank has lately established a "Caja de Ahorros," or savings section, in connection with its other business. The total deposits on December 31, 1919, amounted to 649,394 bolivianos, in 1,933 separate accounts. It is an interesting fact that the Santa Cruz branch held second place in the list of branches, with deposits of 135,656 bolivianos. To encourage saving among children, the bank opens an account in its savings section with an initial credit of 10 bolivianos for the most promising pupils in the public schools.

The statement of the bank's resources and liabilities at the end of 1919 was as follows:

	Bolivianos.
Capital authorized (£4,000,000).....	50,000,000
Capital paid up (£1,600,000).....	20,000,000
Reserve fund (£200,000).....	2,500,000
Emergency fund (£20,000).....	250,000
Disposable fund (£160,000).....	2,000,000
Dividend fund (£24,515).....	306,437
Notes in circulation.....	26,942,094
Deposits.....	21,946,396
Gold.....	16,372,579
Investments.....	40,832,365
Credits abroad.....	17,978,615
Total reserves.....	5,056,437
Net profit for 1919.....	1,380,751

A dividend of 7½ per cent was paid in 1918, and one of 8½ per cent was declared in 1919. The total net profits for the period from 1911 to June, 1919, amounted to 15,762,250 bolivianos.

The state of the bank during the period 1911-1919 is illustrated by the following table:

Years.	Notes in circulation.	Discounts and over-drafts.	Deposits.	Gold.	Capital.	Net profits.
	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>
1911.....	1,195,385	14,125,639	2,385,514	2,728,081	15,937,500	433,570
1912.....	2,577,527	21,771,521	5,909,452	2,097,006	15,937,500	829,094
1913.....	6,543,254	32,397,424	6,952,278	6,659,737	18,962,500	1,261,462
1914.....	13,334,770	37,751,482	7,665,816	6,591,150	18,962,500	1,668,808
1915.....	15,890,079	37,506,369	12,773,654	6,672,630	18,962,500	1,810,134
1916.....	16,815,593	39,607,014	14,267,039	6,959,260	18,962,500	2,268,238
1917.....	20,388,896	39,775,854	21,907,596	7,105,862	18,962,500	2,858,151
1918.....	25,984,984	39,959,093	18,307,692	18,188,882	18,962,500	3,068,790
1919.....	26,942,094	40,832,364	21,946,395	16,372,579	20,000,000	2,944,749

BANCO NACIONAL DE BOLIVIA.

The Banco Nacional de Bolivia is the oldest bank in the country, having been created in accordance with a law of August 17, 1871. The head office of the bank is in Sucre, where most of the stock is held. There are branches in La Paz, Cochabamba, Oruro, Potosi, Tarija, Tupiza, and Uyuni. In 1919 the Banco Francisco Argandoña, of Sucre, was incorporated in the Banco Nacional. This bank was founded in 1892 and had four branches, in addition to the main office in Sucre. Of a total of 112,000 shares of the Banco Nacional, 27,478 are now held by the Argandoña family.

The statement of the bank's capital and reserves on January 29, 1920, was as follows:

	Bolivianos.
Capital paid up.....	11,200,000
Reserve fund.....	5,700,000
Emergency fund.....	370,000
Dividend fund.....	361,226
Total.....	17,631,226

At the same time deposits amounted to 17,934,226 bolivianos and the bank's stock of gold to 4,418,328 bolivianos. Net profits for 1919 were 2,085,177 bolivianos. The bank had paid a total of 19,938,000 bolivianos in dividends to the end of 1919. In 1877 a dividend of 16 per cent was paid, in 1880 one of 20 per cent, and in 1882 one of 24 per cent. Since 1896 annual dividends of 10 and 12 per cent have been paid, 12 per cent being paid in 1918 and 1919.

The state of the bank during the period 1909-1919 was as shown by the following table:

Years.	Notes in circulation.	Discounts and over-drafts.	Deposits.	Gold.	Capital.	Net profits.
	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>
1909.....	7,272,781	13,008,768	5,276,171	3,787,108	6,000,000	847,915
1910.....	8,768,482	15,391,622	7,284,130	6,259,037	6,500,000	954,230
1911.....	8,629,144	17,059,020	10,109,601	6,741,879	6,500,000	1,067,822
1912.....	8,333,540	18,018,435	10,360,085	5,383,393	6,500,000	1,072,050
1913.....	8,432,062	15,923,181	8,160,349	4,780,050	8,000,000	1,094,742
1914.....	2,995,959	13,915,899	9,075,619	3,671,612	8,000,000	1,060,823
1915.....	1,729,866	13,298,823	9,339,123	3,533,475	8,000,000	950,117
1916.....	3,682,977	14,374,678	9,490,659	3,526,825	8,000,000	1,104,946
1917.....	3,970,686	13,021,728	12,510,049	3,502,912	8,000,000	1,108,144
1918.....	3,887,828	15,642,501	12,998,207	3,467,518	8,000,000	1,681,382
1919.....	4,833,619	22,617,734	17,934,226	4,418,328	11,200,000	2,085,177

BANCO MERCANTIL.

The Banco Mercantil was authorized by law of December 7, 1905, and was founded on December 1, 1906. It is the property of the prominent Bolivian mine owner and capitalist, Sr. Simon Patiño, and much of its strength is derived from the large resources that he commands. A large part of the activities of this bank are devoted to financing the various enterprises in which Sr. Patiño is interested. The head office of the bank is in Oruro. The La Paz branch is the best housed bank in the city. There are also branches in Cochabamba, Potosi, Sucre, Tupiza, Tarija, and Antofagasta (Chile).

In 1909 the bank established a mortgage and loan section, with a capital of 800,000 bolivianos. On December 31, 1919, the total circulation of mortgage cedulas amounted to 634,909 bolivianos. The net profit on this section in 1919 was 15,136 bolivianos.

The statement of the bank on January 1, 1920, was as follows:

Capital:	Bolivianos.
Authorized (£2,000,000).....	25,000,000
Paid up (£800,000).....	10,000,000
Reserve fund (£220,000).....	2,750,000
Emergency fund (£7,600).....	95,000
Notes in circulation.....	4,065,511
Gold (£130,062).....	1,625,781
Deposits.....	6,572,921
Net profits.....	401,120

BANCO ALEMAN TRANSATLÁNTICO.

This German institution, a branch of the Deutsche Überseeische Bank, is the only foreign bank in Bolivia. It has branches in La Paz and Oruro. Previous to the war it aided greatly in the financing of German business in Bolivia, and is now showing marked signs of recovery from the effects of the war and the allied restrictions on German business operations.

The statement of the bank on June 30, 1919, was as follows:

	Bolivianos.
Capital.....	625,767
Cash resources.....	205,270
Deposits.....	1,107,353
Net profit during first half year of 1919.....	6,168

A national law of January 3, 1914, required that all foreign banks should bring into the country a capital of at least £50,000, or 625,000 bolivianos, of which at least 20 per cent must be invested in national bonds. At that time the Bank für Chile und Deutschland and the Anglo-South American Bank maintained small branches in Oruro, but did not feel that the prospects of their business justified increasing their capital to the amount prescribed by the law. They accordingly liquidated their business and closed their branches in 1914.

CRÉDITO HIPOTECARIO DE BOLIVIA.

This is a mortgage bank and is situated in La Paz. The bank's statement on December 31, 1919, was as follows:

	Bolivianos.
Capital.....	700,000
Reserve fund.....	200,000
Dividend fund.....	26,000
Emergency guaranty fund.....	18,000

The net profits for the last half year of 1919 amounted to 94,684 bolivianos. The amount of mortgage cedulas in circulation at the end of 1919 was 8,494,800 bolivianos, of which 953,600 bolivianos were selected for amortization. Outstanding loans at that time amounted to 8,903,318 bolivianos, covered by property to the value of 27,565,634 bolivianos. According to law, mortgage banks in Bolivia can loan only up to 50 per cent of the value of the property mortgaged.

BANCO HIPOTECARIO NACIONAL.

This is also a mortgage bank, as its name implies. It is located in Cochabamba, and its operations are largely confined to that region. The state of the bank on December 31, 1919, was as follows:

	Bolivianos.
Capital.....	100,000
Mortgage cedulas in circulation.....	3,847,400
Deposits.....	2,441,897
Net profits for 1919.....	108,679
Funds for conversion of cedulas.....	5,239,309

These cedulas bear interest at from 7 to 10 per cent.

BANCO GARANTIZADOR DE VALORES.

The location of this mortgage and loan bank is in Sucre. Its statement for June 30, 1919, was as follows:

	Bolivianos.
Capital.....	100,000
Circulation of mortgage cedulas.....	3,109,100
Deposits for conversion of cedulas.....	452,790
Net profits for year.....	26,398

PRIVATE BANKS.

Private banking in Bolivia is largely represented by the banking departments of W. R. Grace & Co., Denniston & Co., Duncan, Fox & Co., and Boettiger, Trepp & Co.—all of La Paz, but with branches in other cities. These houses receive regular checking accounts and do considerable foreign banking. The Casa Bancaria Gutierrez Guerra, a private bank of the former President of Bolivia, was declared bankrupt in August, 1920, following the revolution of July and the deportation of President Gutierrez Guerra. This bank had offices in La Paz and Oruro, and aided in financing the operations of some enterprises in which the former President was interested, such as the Sindicato Industrial de Bolivia.

An American bank, to be known as the Pan American Bank, was to be established in La Paz in August, 1920, but the plans of the promoters of the new institution were not realized and the project was abandoned.

MONETARY SYSTEM.

Since the first of 1909 Bolivia has been on a gold basis. The law of December 5, 1908, which provided for this change in the monetary system, declared the English pound sterling and the Peruvian gold pound legal tender within the country at a ratio of 12.50 bolivianos to the pound. By the same law, authorization was given to coin 4,000,000 bolivianos in silver in denominations of 50 and 20 centavos, and 1,000,000 bolivianos in nickel pieces of 5 and 10 centavos. The

boliviano is the old silver dollar standard of 425 grains and 900 fine. However, there is now no silver money in circulation, and the only metallic currency in the country consists of the above-mentioned nickel coins and copper coins of 1 and 2 centavos. The bank notes in circulation are in denominations of 1, 5, 10, 20, 50, and 100 bolivianos. In 1918 an additional 1,000,000 bolivianos in nickel coins were struck off in England. Total issues of nickel to the end of 1917 amounted to 4,800,000 bolivianos. However, it was calculated in 1920 that half of this had disappeared from circulation. During the years 1914-1918 exports of metallic currency amounted to 2,560,744 bolivianos of gold and 1,049,181 of silver, or a total of 3,709,924 bolivianos. At the beginning of 1920 the stock of gold in the country amounted to 19,306,256 bolivianos, held in the possession of four banks. In 1920 United States gold coins were declared legal tender in Bolivia.

The bank-note circulation during the period 1914-1918 (December 31) was as follows: 1914, 21,490,713 bolivianos; 1915, 22,572,750 bolivianos; 1916, 24,970,767 bolivianos; 1917, 29,170,688 bolivianos; 1918, 35,149,633 bolivianos.

EXCHANGE.

At par the boliviano is worth 19½d. or \$0.3893 United States currency. In normal times exchange rates on London and New York have been comparatively stable, but great fluctuations were produced by the war. The exchange on London fell from 19½d. in April, 1914, to 15d. at the end of the year. By the end of 1917 it was at 22d., but in May, 1919, it returned temporarily almost to par. The maximum and minimum quotations of the Banco de la Nacion for 90 days' sight on London during the years 1911-1919 are shown in the following table:

Years.	Pence to the boliviano.		Years.	Pence to the boliviano.	
	Maximum.	Minimum.		Maximum.	Minimum.
1911.....	19½	19½	1916.....	19½	16½
1912.....	19½	18½	1917.....	22	19
1913.....	18½	18½	1918.....	22	19½
1914.....	18½	15	1919.....	19½	18½
1915.....	16½	15			

The efforts of the Government to steady exchange by means of a moratorium, the prohibition of gold exports, the suspension of bank-note conversion, and the fixing of the rate of exchange failed of their desired effect beyond a certain point, and Bolivian money was left to the play of the violent factors working at that time on international business. The same circumstances operated to a large extent on exchange relations between Bolivian and American money. The course of exchange during 1918 was as follows:

	Bolivianos to the dollar.			Bolivianos to the dollar.	
January.....	2.41	to 2.42	July.....	2.37	to 2.40
February.....	2.40	to 2.41	August.....	2.36	to 2.38
March.....	2.40½	to 2.45	September.....	2.34	to 2.35
April.....		2.45	October.....	2.34	to 2.45
May.....	2.41	to 2.45	November.....	2.45	to 2.63
June.....	2.40	to 2.41	December.....	2.62	to 2.65

Between March 8 and March 28, 1919, sight rates on New York rose from 2.68 to 2.91. By November exchange was at 3, and in December it rose from $3.10\frac{1}{2}$ to 3.43. In January, 1920, rates varied between $2.95\frac{1}{2}$ and 3.23, and in February from 2.76 to 2.97. In May they again rose to above 3.15, and in June fluctuated between 3.02 and 3.08, but after the revolution on July 12 rose to over 3.30, which was lower, however, than the rate prevailing for a few days in December, 1919. By November dollar exchange had risen to 3.70.

PUBLIC FINANCE.

NATIONAL FINANCES.

BUDGET.

The national budget drawn up for 1920 provided for the following appropriations for the different departments of Government:

	Bolivianos.
Legislative.....	751, 920
Foreign relations.....	1, 121, 138
Worship.....	116, 740
Government (Interior).....	5, 323, 343
Justice.....	2, 229, 012
Treasury.....	23, 541, 358
Public instruction.....	4, 645, 686
Agriculture.....	453, 440
Public works.....	3, 041, 080
Industry.....	185, 900
War.....	11, 316, 441
Colonization.....	782, 031
Total.....	53, 511, 092
Revenues provided for.....	49, 470, 475
Deficit.....	4, 040, 617

The revenues provided for were classified as follows:

Dominion of the State:

Territorial—

Mining patents.....	400, 000
Patents for concessions of petroleum lands.....	200, 000
Tax of $\frac{1}{2}$ centavo per hectare on State lands.....	80, 000
Other.....	195, 000

Industrial and financial—

Quota from Chilean Government for railway guaran- ties, according to treaty of 1904 and protocol of 1908.....	562, 500
35 per cent of the receipts of the Viacha-Oruro Rail- way.....	656, 250
25 per cent of the receipts of the Río Mlato-Potosi Railway.....	250, 000
25 per cent of the receipts of the Uyuni-Atocha Railway.....	156, 250
25 per cent of the receipts of the Oruro-Cochabamba Railway.....	150, 000
Interest on the loan of 1913.....	200, 000
Net profit from the Empresa Luz y Fuerza Eléc- trica de Cochabamba.....	100, 000
Merchandise tax for service on \$2,000,000 American loan, account of departmental treasury of La Paz..	400, 000
Tax on copper ores, for same purpose.....	120, 000
Income from Tareja-Corocoro branch of railway....	120, 000
Dividends on 401,308 shares in Banco de la Nación..	912, 675
Alcohol monopoly.....	2, 250, 000
Tobacco monopoly.....	800, 000
Other.....	436, 300

Total.....	7, 988, 975
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Public services:	Bolivianos.
Legalization of consular invoices.....	1, 850, 000
Postage stamps.....	360, 000
Telegrams.....	600, 000
Stamped paper.....	380, 000
Transaction stamps.....	220, 000
Extraordinary sources.....	400, 000
Other.....	514, 500
Total.....	4, 324, 500

Direct taxes:

Tax on dividends of joint stock companies, other than mining companies.....	80, 000
Tax on income of joint stock companies.....	30, 000
Tax on income of banks.....	550, 000
Tax on income from mortgages.....	100, 000
Tax on transfers of rubber and mining lands.....	120, 000
Tax on net profit of mining companies—	
For fiscal year 1919.....	3, 000, 000
For fiscal year 1920.....	6, 000, 000
Revenues uncollected from previous year.....	500, 000
Other.....	342, 000
Total.....	10, 722, 000

Indirect taxes:

Import duties.....	6, 985, 000
Surcharge on import duties.....	1, 040, 000
Tax on national alcohols and brandies.....	800, 000
Tax on coca.....	250, 000
Tax on merchandise destined to different Departments..	653, 000
Warehousing and storage duties.....	800, 000
Other.....	543, 000
Total.....	11, 071, 000

Export taxes:

Tax on minerals—	
Tin.....	8, 000, 000
Copper.....	120, 000
Silver.....	400, 000
Bismuth.....	60, 000
Wolfram.....	50, 000
Gold.....	1, 000
Tax on rubber.....	372, 000
Export duty on hides.....	80, 000
Export duty on wool.....	100, 000
Statistics tax on exports.....	180, 000
Income from "Export Notes" ("Vales de Aduana"), to cover deficit from 1919.....	6, 000, 000
Other.....	1, 000
Total.....	15, 364, 000

Grand total revenues calculated..... 49, 470, 475

The annual income of the Government during the years 1904–1913 was as follows:

	Bolivianos.		Bolivianos.
1904.....	6, 838, 576	1909.....	11, 847, 231
1905.....	7, 854, 698	1910.....	12, 583, 232
1906.....	10, 401, 512	1911.....	16, 913, 512
1907.....	13, 166, 684	1912.....	20, 164, 602
1908.....	11, 604, 063	1913.....	22, 018, 874

The relation between budgets, revenues, and expenses for the period 1914-1918 is shown by the following table:

Years.	Budget.	Revenues.	Expenditures.
	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>
1914.....	21,551,350	15,840,217	17,150,093
1915.....	16,985,800	12,826,179	14,791,112
1916.....	11,575,200	15,906,503	18,367,878
1917.....	17,101,012	19,104,721	21,912,453
1918.....	32,586,886	29,957,510	29,966,031

In 1918 various sources of revenue not provided for in the budget brought in amounts that raised the total income of the Government to 52,866,951 bolivianos. The budget of 1919 provided for an income of 31,328,787 bolivianos. In the budget of that year import and export duties represented 46.47 per cent of the total calculated income, of which 23.60 per cent was to be derived from imports and 22.87 per cent from exports. Eight and five-tenths per cent of the Government's revenues are obtained from the State monopolies. In 1919, 25.55 per cent of the calculated income was destined to the service on the public debt.

NATIONAL DEBT.

The public debt of Bolivia on June 30, 1919, was as shown in the following table:

FOREIGN.

Loans.	Bankers.	Inter- est.	Amor- tiza- tion.	Rate.	Total issue.	Total amor- tized to July 1, 1919.	Total in circula- tion on July 1, 1919.	Yield in bolivi- anos.
		<i>Per ct.</i>	<i>Per ct.</i>					
Morgan loan of 1909.	J. P. Morgan & Co.	6	2	90	£500,000	£138,300	£361,700	1,521,254
French loan of 1910.	Crédit Mobilier Français.	5	2½	87	1,500,000	168,920	1,331,080	16,638,500
French loan of 1910, supplementary.	do.	5	2½	87	100,000	51,000	9,000	112,500
French loan of 1913.	do.	5	1	90	1,000,000	66,160	933,840	11,673,000
Yungas Railway loan.	Chandler & Co., New York.	6	1	90	500,000	20,918	479,082	5,988,523
Total.....					3,500,000	415,298	3,114,702	38,933,777

INTERNAL.

Securities.	Inter- est.	Amor- tiza- tion.	Total issue.	Total amor- tized to June 30, 1919.	Balance on July 1, 1919.	Bonds to issue.	Total debt.
	<i>Per ct.</i>	<i>Per ct.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>	<i>Bolivianos.</i>
Bonds of the internal debt.	3	1	5,029,425	3,151,500	1,571,925	1,080,317	2,655,212
Bonds of the wars of the Pacific and the Acre	8	2	2,378,100	301,700	2,073,700	51,420	2,125,120
Bonds of the Acre indeniza- tion	3	3	312,900	49,700	263,200	126,451	389,651
State bonds of 1911.	8	1	9,943,000	600,000	9,343,000	57,000	9,400,000
Customs notes ("vales de aduana")	9		10,250,000	1,018,660	6,201,340		6,201,340
Total.....			27,913,725	8,457,560	19,456,165	1,315,188	20,771,353

FLOATING DEBT.

Character of debt.	Bolivianos.
Debt to national banks.....	4,251,376
Short-time debts to foreign banks.....	5,280,376
Mortgage loans.....	261,831
Special accounts.....	683,889
Total.....	10,477,472

TOTAL PUBLIC DEBT.

Character of debt.	Bolivianos.
Foreign.....	38,933,778
Internal.....	20,771,353
Floating.....	10,477,472
Total.....	70,182,603

The foreign obligations of the country represent a per capita indebtedness of about \$7.50. In the words of a former minister of finance, this debt is "wholly represented by works of public utility." Of the proceeds of the French loan of 1910, £1,000,000 (\$4,866,500) was invested in the foundation of the Banco de la Nación. Practically all of the remaining foreign debt was contracted for the purpose of building railways. The French loan of 1913 was specifically destined to the construction of the railway between Tupiza and La Quiaca, and the Chandler loan of 1917 to work on the Yungas Railway. A former loan held by the National City Bank of New York amounted in 1916 to 1,274,166 bolivianos (about \$496,035). However, during that year the Bolivian Government took advantage of the favorable rate of exchange to transfer this debt to the Banco de la Nación.

By law of January 13, 1920, the National Congress authorized the President to secure foreign loans totaling £8,711,560. The proceeds were to be destined to railway construction and sanitary works in the leading cities. Negotiations were opened in the United States, and at the time of the revolution in July, 1920, arrangements had been practically concluded with a New York banking house for a loan of \$10,000,000. The money from this loan was to be used for financing four different railway projects and for refunding the French loans, which the Bolivian Government had called, in order to take advantage of the favorable exchange situation. However, negotiations were suspended, as a result of the unsettled political state of the country, before the final contract had been signed between the bankers and the Bolivian Government.

The financial record of the Bolivian Government has been excellent. Even in times of great financial stringency, such as prevailed during the early part of the war, the foreign obligations of the nation were met promptly, though it required the curtailment of the internal expenses of the Government to do this. The national leaders have favored a vigorous program of public works, especially of railway construction, and in their anxiety to forward these projects may at times have placed too much of a strain on the national budget. Special imposts have been created and others have been hypothecated

to meet the special obligations incurred in the promotion of this policy, yet up to the present, even in the critical days after the revolution of July, the Government has paid the service on its foreign loans with scrupulous correctness. However, the contracting of further obligations of any magnitude must force the Government to devise new sources of revenue, such as a greatly increased tax on land.

The Bolivian Government had called the outstanding French loans before the revolution, and notified the *Crédit Mobilier* that it would liquidate these obligations on October 25, 1920. On the failure to consummate the American loan, an arrangement was made with the three leading banks of the Republic for a loan of 11,600,000 bolivianos with which to meet the French debt.

DEPARTMENTAL FINANCES.

The budgets of the different Departments of the Republic for 1920 were as follows:

Departments.	Revenues.	Expenditures.	Departments.	Revenues.	Expenditures.
	<i>Bolivianos.</i>	<i>Bolivianos.</i>		<i>Bolivianos.</i>	<i>Bolivianos.</i>
Chukisaca.....	274,790	274,790	Tarija.....	164,200	161,200
La Paz.....	2,499,196	2,499,196	El Beni.....	226,284	226,284
Cochabamba.....	508,303	508,303	Deficit for Potosi.....	9,370	
Potosi.....	1,132,149	1,141,519			
Oruro.....	210,363	210,363	Total.....	5,215,346	5,215,346
Santa Cruz.....	190,691	190,691			

The total expenditures of the departmental treasury of La Paz in 1918 amounted to 5,181,394 bolivianos, a large part of which was destined to finance the work of construction on the Yungas Railway.

The revenues and expenditures of the Department of La Paz for 1920 were classified as follows:

REVENUES.		Bolivianos.
Ordinary revenues:		
Land tax.....		201,168
Cadastral tax.....		92,469
Tax on coca.....		392,960
Export tax on hides.....		40,000
Others.....		105,000
Special taxes for sanitary works.....		560,000
Special revenues for Yungas Railway.....		1,107,600
Total.....		2,499,197
EXPENDITURES.		
Government or administration.....		91,800
Treasury.....		352,516
Public instruction.....		36,960
Justice.....		23,120
Worship.....		39,960
Charity and public benefit.....		117,720
Public works and roads.....		41,510
Permanent assignments of revenues.....		65,800
Eventual assignments of revenues.....		62,180
Yungas Railway.....		1,107,600
Sanitary works.....		560,000
Total.....		2,499,196

This budget is fairly representative of those of the other Departments. There is a tax on indirect inheritances in all the Departments, and in the principal stock-raising Departments, such as Santa Cruz and Chuquisaca, there are export duties on cattle and hides.

MUNICIPAL FINANCES.

The distinctly municipal finances are separated from those of the national and departmental governments, though special appropriations are sometimes made by such governments for specifically municipal needs. The budget for the city of La Paz for the fiscal year 1920 provided for the spending of 1,742,717 bolivianos. Of this sum 1,108,863 bolivianos was for general administrative purposes, 487,384 bolivianos for the construction of the public hospitals in Miraflores, and 146,370 bolivianos for public instruction. Among the sources of municipal revenues in La Paz are the following: Rent of property belonging to the city, tax on beer, police fines, commercial patents and taxes, tax on coca, sales of niches in cemetery, and water rates. The municipal revenues of Cochabamba for 1917 amounted to a total of 363,530 bolivianos, of which 109,499 bolivianos were destined to the maintenance of the schools supported by the city. The largest source of revenue is that known as "patentes municipales," or licenses. These vary from 1 boliviano for permission for Indians to wear a mask on feast days to 2,000 bolivianos for breweries of the first class.

None of the Bolivian cities owe money abroad. Some have borrowed sums for the purpose of carrying out municipal improvements, but from local banks or other interests. The most important financial developments in municipal circles at present are in connection with the large projects for sanitary works, including sewage and water-works, in La Paz, Cochabamba, and other cities. These projects, which will involve the expenditure of large sums of money, are in the hands of an American engineering firm and are described elsewhere.

Appendix: TRAVEL NOTES.

ROUTES FROM UNITED STATES TO BOLIVIA.

VIA WEST COAST.

Bolivia can be reached from the Atlantic and Gulf ports of the United States by several different lines, though, as it is an inland country, travelers must disembark at either a Peruvian or a Chilean port. There are fortnightly sailings from New York by the four steamers of the Grace Line. These steamers do not stop at Mollendo on the way out but put in at Arica and Antofagasta, and call at Antofagasta and Callao only on the return voyage. The time from New York to Arica is 15 days, and to Antofagasta 2 days longer. The fare to Arica and Antofagasta is, respectively, \$290 and \$325. The service on the vessels of this line is very satisfactory. A very good service is also offered by the two steamers *Ebro* and *Essequibo*, of the Pacific Steam Navigation Co. During 1920, through service between Valparaiso and New York via Habana was initiated by the Compañía Sud-Americana de Vapores, or Chilean Line. A former Japanese steamer, now called the *Renaico*, is used in this service. Calls are made at Mollendo, Arica, and Antofagasta. Persons taking the ships of the United Fruit Co. from New York or New Orleans can transfer at Colon to steamers of the Chilean or the Peruvian Lines, of which there are frequent sailings to the principal west coast ports. These sailing from Pacific coast ports of the United States by steamers of the Pacific Mail can also transfer at the Isthmus.

There is a choice of three routes between the Pacific coast and La Paz and other points in Bolivia. These start, respectively, from Mollendo, in Peru, and from Arica and Antofagasta, in Chile. Each of these lines has certain advantages.

By taking the Mollendo Line, those who fear "soroche" or mountain sickness can stop off at Arequipa (7,550 feet) long enough to accustom themselves to the higher altitude before going up to the plateau. Arequipa is itself an important market for most standard lines of goods. At Puno, above Arequipa, passengers are transferred across Lake Titicaca by comfortable steamers to Guaqui in Bolivia.

The chief advantage of the Arica Line is the short time required to reach La Paz by that route, the ascent being especially rapid on the rack rail section between Central and Piquios.

The line from Antofagasta crosses the barren nitrate pampa and then climbs onto the plateau in the vicinity of the frontier at Ollague. Thence the route lies across the salt plains of Uyuni and north by Oruro to La Paz. The great copper mining camp of Chuquibambilla lies a few miles from Calama, Chile, on a spur of the railway. The international express between Antofagasta and La Paz is one of the best trains in South America, the quality of the service being excellent in every respect. All three lines from the coast offer fine scenic attractions to the traveler.

Comparative details in regard to the three routes are given in the table below. The fares given are subject to change without notice. Passenger rates are affected by fluctuations in exchange between the two coast countries and Bolivia, especially by variations in the value of the Chilean peso.

Items.	Mollendo.	Arica.	Antofagasta.
Distances between ports:			
Time.....		One day from Mollendo	Two days from Arica.
Cost.....		\$15, Mollendo to Arica.	\$41, Arica to Antofagasta; \$50, Mollendo to Antofagasta.
Port:			
Population.....	2,000	5,000	30,000.
Character of port.....	Open roadstead	Open bay, partly protected by island.	Open roadstead.
Landing facilities.....	Boats; landing difficult in rough weather.	Boats	Boats.
Hotels.....	Gran and Ferrocarril	Veragua	Londres and Grand.
Railway to La Paz.....	Southern Ry. of Peru and Guaqui-La Paz Ry.	Arica-La Paz Ry.	Antofagasta & Bolivia Ry.
Owner of railway.....	Peruvian Corporation	Chilean Government	Antofagasta & Bolivia Ry. Co.

Items.	Mollendo.	Arica.	Antofagasta.
Distance from La Paz:			
Miles.....	529 (846 kilometers).....	279 (446 kilometers).....	727 (1,163 kilometers).....
Time—			
Up.....	46 hours 30 minutes.....	22 hours 20 minutes.....	43 hours.
Down.....	31 hours 30 minutes.....	21 hours.....	38 hours.
Side trips.....	Juliacá-Cuzco (210 miles, 10 hours).	Arica-Taena.....	Longitudinal Ry. at Baquedano, north to Iquique and Pisagua, south to Santiago; Calama-Chuquibambá (14 miles, 1 hour).
Altitude:			
Highest point.....	14,687 feet, at Crucero Alto.	13,960 feet, at General Lagos.	12,979 feet, at Ascotan.
Other points.....	7,550 feet, at Arequipa.....		7,400 feet, at Calama.
Fare:			
To La Paz.....	50.30 soles.....	66.50 pesos (Chilean).....	110.75 pesos (Chilean).....
From La Paz.....	75.70 bolivianos (75.65 soles round trip).	34.90 bolivianos.....	67.65 bolivianos.
Berth.....	No sleeping cars; berth on steamer included.	To La Paz, 18.50 pesos; from La Paz, 9.40 bolivianos.	To La Paz, 34.30 pesos; La Paz to Antofagasta, 16 bolivianos.
Meals.....	Price included with ticket.	5 pesos or 3 bolivianos per meal.	5 pesos or 3 bolivianos per meal, table d'hôte.
Baggage:			
Amount free.....	70 kilos (155 pounds).....	50 kilos (110 pounds).....	50 kilos.
Charge for excess.....	Up, 24.35 soles per 100 kilos (230 pounds); down, 35.3° bolivianos per 100 kilos.	Up, 32.50 pesos per 100 kilos; down, 16.50 bolivianos per 100 kilos.	Up, 56.78 pesos per 100 kilos; down, 36.10 bolivianos per 100 kilos.
Inspection.....	Baggage declared in transit not inspected at Mollendo; all baggage inspected at Guaqui or La Paz.	Baggage in transit not inspected at Arica; all baggage inspected at La Paz.	Baggage in transit not inspected at Antofagasta; hand baggage inspected at frontier, rest at destination.
Number of trains:			
Up.....	Two (Thursday and Saturday).	One (Monday).....	Two (Tuesday and Saturday).
Down.....	do.....	One (Thursday).....	Two (Tuesday and Friday).
Changes and connections:	Arequipa (on up trip); Presio (train to steamer); Guaqui (steamer to train).	None.....	Uyuni (change trains).

Foreigners entering Bolivia must be able to show a passport for the purpose of establishing their identity and nationality. Such passports must be viséed by the Bolivian consul in the country of departure, and also by the Bolivian consular representative at Arica, Antofagasta, Puno, La Quiaca, or Corumbá, depending on the route by which the traveler enters Bolivia. Bolivian consuls in foreign countries can require the presentation of passports by foreigners 10 days before their departure for Bolivia, though this is seldom required in practice. Foreigners entering Bolivia are further required to present their passports to the police, when arriving at their destination, and to explain their reasons for being in the Republic (as is also required by the law in Peru). All these restrictions, as provided for in a presidential decree of March 26, 1920, constitute a very radical departure from Bolivia's previous policy of permitting almost uninterrupted entrance and egress to foreigners.

VIA EAST COAST.

Persons desiring to reach eastern Bolivia by way of the Amazon must transship at Para to the steamers of the Amazon River Steam Navigation Co. The only passenger steamers from the United States that touch at Para are those of the Lloyd Brasileiro, though vessels of the Booth Line from England regularly make Para on their outer voyage and some of them ascend the river as far as Manaus. The usual destination of the up-river boats on the Amazon is Manaus, though some of them ply to Porto Velho, which is on the direct route into Bolivia. In the former case travelers are compelled to reembark at Manaus on a steamer bound up the Madeira for Porto Velho. At San Antonio, near Porto Velho, is the terminus of the Madeira-Mamore Railway, which extends 186 miles to Guayaramerin. Passengers bound for Riberalta cross the river at this point and take mules for their destination on the Beni, about 70 miles to the west. Those bound for Trinidad or Santa Cruz take launches for the trip up

the Mamore, and if their destination is Santa Cruz they leave the steamer at Puerto Velarde or Cuatro Ojos, from which point they reach Santa Cruz by mule.

The Santa Cruz region can also be reached by the railway connection across Brazil from Santos to the Paraguay River or directly from Buenos Aires by way of the Parana and Paraguay. The former route entails transfers at Sao Paulo and Bauru from one train to another and at Porto Esperanca from the train to the steamer for Corumba. From Corumba there is a daily launch service to Puerto Suarez on the Bolivian side of the Laguna de Caceres. At Puerto Suarez persons desiring to travel into the interior of Bolivia must engage mules, which are usually difficult to obtain at any price. The facilities for travel over this long and difficult trail are described in the chapter on "Transportation and communications." There are direct steamers between Buenos Aires and Corumba by the Mihanovich Line, with a weekly schedule of sailings. These boats are comfortable, though the fare is high and the trip consumes about 10 days.

The Bolivian Plateau can also be reached from Buenos Aires by way of La Quiaca, between which two points there are through rail connections, though involving a change of trains at Tucuman because of the different gauges prevailing north and south of that city. Between La Quiaca at the frontier and Atocha, the present Bolivian railhead, there is a gap of 200 kilometers (125 miles), which must be covered by automobile or mule, depending on the season of the year. Between Atocha and La Paz there is a regular train service, though with a change of trains at Uyuni. From about the middle of May to about the middle of November a regular automobile service is maintained for the transportation of passengers and their baggage. The company that operates this service owns 10 cars (most of them of German make), with a capacity of 60 passengers. The fare for the entire trip is 70 bolivianos, and the charge for excess baggage above the very small maximum allowed each passenger is 1.75 bolivianos per 5 kilos. The cars leave Villazon, on the Bolivian side of the border, at 1 p. m. on Tuesdays and Fridays, and reach Atocha at 12.30 p. m. the following day, the passengers spending the night in Tupiza, about midway between the two terminals of the route. La Quiaca can be reached from Buenos Aires by two different routes. The shortest and most rapid route is over the Central Argentine. A train leaves the Retiro station in Buenos Aires at 6 p. m. on Tuesday and arrives at Tucuman at 7 p. m. the next day. At Tucuman change is made to the narrow-gauge line of the Central Norte, a State railway, by which passengers reach La Quiaca on Thursday evening at 7.20. Thus the distance of 1,107 miles from Buenos Aires is made in a little over two days. The fare from Buenos Aires to La Quiaca is 97.70 Argentine pesos, and the charge for baggage over the 50 kilos allowed each passenger is 4.51 pesos for each 10 kilos.

The other route out of Buenos Aires is over the Central Cordoba, a train leaving Buenos Aires at 9.30 p. m. on Wednesday and reaching La Quiaca at 7.30 p. m. on Saturday. As in the case of the other route, passengers are forced to change at Tucuman to the Central Norte. The distance over the Central Cordoba is 1,185 miles. Travelers going from Bolivia into Argentina can leave La Quiaca over the Central Argentine at 8.30 a. m. on Tuesday, reaching Buenos Aires at 12.45 p. m. on Thursday. The train leaving La Quiaca at the same hour on Sunday makes connections at Tucuman with a Central Cordoba train, which arrives in Buenos Aires at 7.20 a. m. on Wednesday.

For passengers from Buenos Aires to points in Bolivia there are two trains a week from Atocha to Uyuni, a distance of 56 miles. These trains leave Atocha at 1.30 p. m. on Wednesdays and Sundays and reach Uyuni at 5.35 p. m. At Uyuni connections are made for La Paz, trains leaving for the north at 8.10 p. m. on the same days and arriving in La Paz at 2.25 p. m. the following day. Trains leave La Paz for the south at 3.30 p. m. on Tuesdays and Fridays, arriving at Uyuni at 7.48 the next morning. Trains leave Uyuni for Atocha at 9 a. m. on Wednesdays and Saturdays, reaching Atocha at 12.40 p. m.

The fare between Atocha and La Paz is 38.90 bolivianos. Thus the total fare between Buenos Aires and La Paz is about \$80 for a distance of about 1,637 miles. Passengers traveling to Bolivia from Buenos Aires can make complete arrangements for the through trip through the Expreso Villalonga or the Expreso Internacional, both of which have offices in the Argentine capital. Villalonga sells a through ticket, including railway and automobile fare, hotel charges, and berths on train, with meals, for 300 pesos, or about \$130.

The total time between Buenos Aires and La Paz for passengers using the Central Argentine connection is 140½ hours. From La Paz to Buenos Aires it is 141½ hours.

There are two small "hotels" at Atocha, where very poor accommodations are provided for travelers who are forced to pass the night in this village. However, it is generally possible to secure a night's lodging in a building that belongs to the railway company, or in the sleeping car that lies here overnight before returning to

Uyuni. During the rainy season persons who attempt to cross between La Quiaca and Atocha are forced to engage mules and a muleteer at either terminal.

Those bound for the Santa Cruz region of Bolivia from Buenos Aires must leave the main line of the Central Norte at Perico for the railhead of the branch line to the northeast at Embarcacion. At this point it is necessary to engage pack animals for the trip north by Yacuiba to Santa Cruz.

Bolivia can also be reached from Buenos Aires by way of Valparaiso. This requires a trip by train over the Transandine Railway and an ocean voyage from Valparaiso to Antofagasta. Arrangements for passage can be made through either of the Buenos Aires express companies named above.

ACCOMMODATIONS FOR TRAVELERS IN PRINCIPAL CITIES.

LA PAZ.

The La Paz hotel most frequented by foreigners is the Paris, which is situated on the central plaza. The rates are from 12 to 15 bolivianos a day, American plan. The rooms are attractive, though none have private baths in connection. The food is ample in quantity, though not always most appetizing to fastidious travelers. Electric stoves can be secured at night until 10 o'clock for an additional charge. Rooms can be engaged in advance from the coast by wire. The Central is another hotel, which is being increasingly frequented by foreigners. There are automobiles at the railway station to meet the trains. The fare from the station is one boliviano, though an additional charge is made for the passenger's baggage. Money can be changed at the banks or at the shops of the money changers on Calle Comercio.

Among the side trips that can be made from La Paz are the following: To Corocoro copper mines, by Arica-La Paz Railway; to Sorata, by automobile; to Yungas district, by Yungas Railway and mules.

ORURO.

The distance from La Paz to Oruro is 233 kilometers (145 miles), which is covered by the International train in less than seven hours. There are seven trains a week between the two cities, five of which are local, the other two running between La Paz and Antofagasta. Two night trains, carrying very comfortable sleeping cars, were put on the Oruro-La Paz run during 1920. The total distance between Oruro and Antofagasta is 930 kilometers (573 miles). The fare to Oruro from La Paz is 17.20 bolivianos, and from Oruro to Antofagasta 66.05 bolivianos.

The principal hotels in Oruro are the Eden, the Unión, and the Quintanal, all of which are situated on the principal plaza and at some distance from the station, from which there is a regular taxi service. Rates are from 10 to 12 bolivianos per day, American plan. The rooms in these hotels are quite satisfactory according to west-coast standards, though bathroom accommodations are not of the most modern. The nights in Oruro are very cold, and persons visiting this city should be supplied with especially warm clothing.

The following side trips can be made from Oruro: To Uncia and Llallagua, via Machacamarca, two trains a week from Machacamarca to mines; to Cochabamba, via railway, four trains a week each way.

COCHABAMBA.

Cochabamba is reached from Oruro over the 211-kilometer (131-mile) branch of the Bolivia Railway, which was opened to traffic in 1917. On the descent from Oruro to Cochabamba the trains cover the distance in 10 hours, and in the opposite direction in 12 hours. Passengers coming from either Antofagasta or La Paz formerly had to spend a night in Oruro, leaving for Cochabamba the following morning at 8.30 a. m., but in May, 1920, a biweekly night train from La Paz was put on, which enables passengers to change directly at Oruro to the train for Cochabamba. Also, whereas there were formerly only two trains a week into Cochabamba, there are now four. The one-way fare from Oruro is 17.40 bolivianos. The cars on this line are comfortable, and the food is good. The route, moreover, offers one of the best scenic attractions in South America.

The best hotel in Cochabamba is the Majestic, which is, in fact, one of the two best hotels in Bolivia. Rates are from 10 to 12 bolivianos a day. The Unión is the hotel formerly most frequented by foreign travelers. Public automobiles are available for hire, as in all the larger towns of Bolivia.

The following side trips can be made from Cochabamba: To Quillacollo, by electric train; to Sacaba, by automobile (during dry season); to Punata, Cliza, and Arani, by train of the C. L. & F. E. C.; to Totora, by automobile (during dry season); to Sucre, by automobile (during dry season); to Santa Cruz, by train, automobile, and mule.

POTOSI.

Potosi is connected with the main railway system of Bolivia by a branch which leaves the line of the Antofagasta & Bolivia at Río Mulato—a place that consists only of a railway station and a small hotel where passengers may spend the night. It lies 105 kilometers (65 miles) north of Uyuni and 441 kilometers (274 miles) south of La Paz. The branch line to Potosi passes through some very rough country and crosses the divide at over 15,800 feet. There are two trains a week between Río Mulato and Potosi, making the trip in a little less than 9½ hours.

SUCRE.

During the dry season communications between Sucre and the outside world are by means of a regular automobile service from Potosi, or from the railhead at Betanzos, about 55 kilometers (34 miles) out of Potosi. During the rainy season the trip must be made by mule. The total distance between Potosi and Sucre is about 171 kilometers (106 miles). During the dry season—May to December—when the automobile service is maintained, the road is one of the best in Bolivia. The automobiles belong to the Empresa de Automoviles J. Moscoso, which receives a subsidy from the Bolivian Government. Large American cars, carrying 10 passengers in addition to the driver, are used. The cars cover the distance between the two places in about 9½ hours. The fare between Potosi and Sucre is 60 bolivianos, and there is a high charge for baggage. When the cars operate from Betanzos in connection with the passenger train from Potosi, the charges are about a third less. The trip is made twice a week each way.

The best hotel in Sucre is the Colón, which is situated on the main plaza. Another hotel is the Hispano-Americano. Rates are very cheap at both these places, but the accommodations leave something to be desired.

From about the middle of May to the middle of November there is a biweekly automobile service from Sucre to Cochabamba. This service is described in the chapter entitled "Transportation and Communications" (see p. 91).

SANTA CRUZ.

The different routes to this isolated city of 20,000 people in eastern Bolivia have been described in the section referred to above. The most practicable route is that from Cochabamba by way of Totora and Samaipata, though this route also requires some primitive traveling through very mountainous country. The best hotel in Santa Cruz is the Comercio.